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INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONFIGURATION

VOLUME IV-G, One-Third Octave Band Spectrograms of Wake Split-Film Data, Fairings and Surface Devices

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APPLIED TECHNOLOGY LABORATORY POSITION STATEMENT

In 1975 a wind tunnel test program was conducted in the Boeing-Vertol 20-foot V/STOL Wind Tunnel on a 1/5th-scale UTTAS model to investigate and find solutions for several aerodynamic problems encountered during the UTTAS flight-testing. Specifically, these tests focused upon (a) the structure of the hub/rotor wake in the vicinity of the empennage, (b) the formulation of the ground vortex and its relation to hub loads and fuselage loads during transition, and (c) the occurrence of vibratory air pressures from the blade passing over the fuselage. Only portions of the above-mentioned wind tunnel test data were reduced and analyzed in addressing the flight-test problems of the UTTAS aircraft.

Under Contract DAAJ02-77-C-0020, Boeing-Vertol completed analyses on the data to understand more completely the aerodynamic interactions that are involved and to formulate instructions for the guidance of designers in these respects. The results of these studies are applicable to all existing and future single-rotor/tail rotor helicopters. The data have been segregated according to aerodynamic interactions and associated phenomena/problem areas. From this body of knowledge, a generalized set of design-guidelines meaningful to the single-rotor helicopter design concept formulation were developed and are included in these reports.

Mr. Robert P. Smith of the Aeronautical Technology Division, Aeromechanics Technical Area, served as project engineer for this effort.

DISCLAIMERS

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This is the seventh of the seven sub-volumes of Volume IV containing one-third octave band spectrographs of the model helicopter hub/rotor wake as it was modified by various aerodynamic devices. This sub-volume deals with the effects of various fairings and also of surface devices. ↗		

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PREFACE

The entire report describing the investigation of **INTERACTIONAL AERODYNAMICS OF THE SINGLE-ROTOR HELICOPTER CONFIGURATION** comprises eight numbered volumes bound as 33 separate documents. The complete list of these documents is as follows:

Volume I, Final Report

Volume II, Harmonic Analyses of Airframe Surface Pressure Data

- A — Runs 7-14, Forward Section
- B — Runs 7-14, Mid Section
- C — Runs 7-14, Aft Section
- D — Runs 15-22, Forward Section
- E — Runs 15-22, Mid Section
- F — Runs 15-22, Aft Section
- G — Runs 23-33, Forward Section
- H — Runs 23-33, Mid Section
- I — Runs 23-33, Aft Section

Volume III, Flow Angle and Velocity Wake Profiles in Low-Frequency Band

- A — Basic Investigations and Hubcap Variations
- B — Air Ejector Systems and Other Devices

Volume IV, One-Third Octave Band Spectrograms of Wake Split-Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Explorations
- C — Solid Hubcaps
- D — Open Hubcaps
- E — Air Ejectors
- F — Air Ejectors With Hubcaps; Wings
- G — Fairings and Surface Devices

This volume is

Volume V, Harmonic Analyses of Hub Wake

Volume VI, One-Third Octave Band Spectrograms of Wake Single Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Exploration
- C — Hubcaps and Air Ejectors

Volume VII, Frequency Analyses of Wake Split-Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Explorations
- C — Solid Hubcaps

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- D - Open Hubcaps
- E - Air Ejectors
- F - Air Ejectors With Hubcaps; Wings
- G - Fairings and Surface Devices

Volume VIII, Frequency Analyses of Wake Single Film Data

- A - Buildup to Baseline
- B - Basic Configuration Wake Exploration
- C - Hubcaps and Air Ejectors

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INTRODUCTION

Volume IV presents spectrograms of the flow angles and velocity components for each run and its test points. Specifically, these machine plots show the root mean square value of each wake parameter over discrete frequency intervals one-third of an octave band in width. The octave arrangement is selected to provide 19 spectral increments from 3.9 to 250.0 Hz centerband frequency. A special computer program is employed to derive wake parameters within these bands consistent with corresponding basic spectral functions depicted in Volume VII.

The graphs showing the one-third octave band values are sequenced in the same order as the Outline of Wake Investigations (Table 1). These graphs are distributed among Volumes IV-A through IV-G by the major categories of Table I in the following arrangement:

Volume IV-A	Build-up to Baseline
Volume IV-B	Basic Configuration
Volume IV-C	Effect of Hub Caps Section 1 & 2
Volume IV-D	Effect of Hub Caps Section 3 & 4
Volume IV-E	Effect of Hub Caps Section 5 and Effect of Air Ejectors
Volume IV-F	Air Ejectors with Open Hub Caps and Effect of Wings and Misc. Section
Volume IV-G	Effect of Wings and Misc. Sections 2 and 3

The Table I outline and other material is included for reference and as a context to the work of each sub-volume. Table 2, the List of Test Runs, arranges the runs in numerical order and gives pertinent text parameters.

The Index of Rake Positions, Table 3, lists the hot film transducer rake positions in the model coordinate system for each run and its test points. The main feature of Table 3 is the indexing of the test point number to the model waterline station and butt line as it varied from run to run. The table groups the runs as they shared the indexing correspondence of point with position. It is emphasized that the runs in a group do not necessarily all share the same number of test points but they do have same correspondence within their respective ranges of test points.

The orientation of the rake is shown pictorially in Figures 1 through 6 for the various test runs. Figure 7 presents a scaled drawing of the model with reference to the three-axis coordinate system. Table 4 lists the center frequency and the upper and lower band limits for each of the numbered one-third octave bands.

TABLE 1			
OUTLINE OF WAKE INVESTIGATIONS			
Description	Configuration Code	Run No.	Base-line
<u>Build-up to Baseline</u>			
1. Nacelles removed	$K_{13}+H_1-N$	149	150
2. Blades off, rotating hub	$K_{13}-M+H_{1.0}$	160	156
3. " " , non-rotating hub	$K_{13}-M+H_{1.0}$	158	156
4. " " , hub off	$K_{13}-M-H_{1.0}$	159	156
<u>Basic Configuration</u>			
1. <u>Wake Explorations near Empennage</u>			
(a) 15" Long. + traverse at T/R C.L.	K_{11}	111	---
(b) 9" Vert. + " above T/R "	"	112	---
(c) 2" " " in vortex	"	113	---
(d) 8" " " (continue 112)	"	114	---
(e) 13" " " behind stab.	"	115	---
(f) Lateral traverse, left stab. (One T.P. only)	"	116	---
(g) Same continued	"	117	---
(h) Same continued (One T.P. only)	"	118	---
(i) Lateral traverse right stab.	"	119	---
(j) T/R effect on wake	$K_{11}+T_2^0$	121	115
2. <u>Climb/Descent Studies</u>			
(a) Climb 900 FPM	K_{11}	135	---
(b) Descent 800 FPM	"	136	---
<u>Effect Of Hub Caps</u>			
1. <u>Solid Caps on Canister</u>			
(a) 7.6" diam. 2.17" ht. soft Pitch Arms	$K_{11}-H_{1.0}+H_{1.2}$	137	136
(b) 7.6" diam. 2.17" ht. stiff Pitch Arms	$K_{13}+H_{1.2}$	153	156
(b) 7.6" diam. 2.45" ht. flt. test config.	$K_{13}+H_{1.2.1}+I_r$ $+E_{1.0}$	207	188

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>Effect of Hub Caps (Continued)</u>			
2. <u>Solid Caps Raised Above Canister</u>			
(a) 7.6" diam. 2.45" ht. 70" depth, .55 gap	$H_{1.2.2}+I_1+E_{1.0}$	208	188
(b) 10.0" diam. 3.25" ht. 1.55" depth, .50" gap	$H_{1.8.1}+I_1+E_{1.0}$	189	188
(c) 10.0" diam. 4.125" ht. 2.05" depth, .875" gap	$H_{1.8.2}+I_1+E_{1.0}$	190	188
(d) Repeat of 189	" " "	210	188
3. <u>Open Caps Without Underbody</u>			
(a) 10.0" diam. 1.25" gap, blades	$H_{1.0.2}+I_1+E_{1.0}$	193	188/166
(b) " " " gap, no blades	$H_{1.0.1}-M$	166	158
(c) " " 2.05" gap, blades	$H_{1.14.1}+I_1+E_{1.0}$	211	188
(d) " " 1.75" gap, no blades	$H_{1.0.1}-M$	165	158
(e) " " 1.87" gap, blades	$H_{1.0.3}+I_1+E_{1.0}$	191	188
(f) 16" diam. 2.00" gap, blades	$H_{1.7.1}$	168	156/167
(g) " " " gap, no blades	$H_{1.7.1}-M$	167	158
(h) " " 4.00" gap, blades	$H_{1.7.2}$	169	156
4. <u>Open Caps with Underbody</u>			
(a) 7.6" diam. 1.25" gap	$H_{1.11.1}+I_2+E_{1.0}$	194	188
(b) " " " "	$H_{1.11.1}+I_2+E_{4.0}$	198	188
(c) " " " " center post	$H_{1.11.2}+I_2$	202	194
(d) 10.0" diam. .5" gap, no blades	$H_{1.5.1}-M$	164	158
(e) " " 1.25" gap, no blades	$H_{1.5.2}-M$	161	158
(f) " " 2.0" gap, no blades	$H_{1.5.4}-M$	163	158
(g) " " 4.0" gap, no blades	$H_{1.5.3}-M$	162	158
(h) " " 1.25" gap	$H_{1.5.2}$	154	156/161
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>5. Miscellaneous Hub Covers</u>			
(a) Hub fairing 16" diam.	H _{1.3}	151	150
(b) Wham-O-Frisbee 10" diam.	H _{1.9.0} +E _{1.2}	182	181
(c) Fab. glass Frisbee 16" diam.	H _{1.9.1} +E _{1.2}	183	181
<u>Effect of Air Ejectors</u>			
1. Basic system no blowing	H _{1.0} +E _{1.0}	172	156
2. " " 40 psi	" "	173	156/172
3. " " 150 psi	" "	174	156/172
4. Wide chord shroud 40 psi	H _{1.0} +E _{2.5.1}	175	156/173
5. Wide " " 150 psi	" "	176	156/174
6. W/C shroud w. lip 40 psi	H _{1.0} +E _{3.5.2}	184	156/173
7. Same Contoured Parallel 150 psi	H _{1.0} +E _{3.5.4}	187	156/174
8. Bifurcated duct 0 psi	H _{1.0} +E _{5.0}	203	156
9. " " 40 psi	" "	204	156/203
10. " " 150 psi	" "	205	156/203
<u>Air Ejectors with Open Hub Caps with Underbodies</u>			
1. 7.6" diam. 1.25" gap, 0 psi	H _{1.11.1} +I ₂ +E _{1.0}	194	188/172
2. " " " " 20 psi	" " " "	195	188
3. " " " " 40 psi	" " " "	196	188/173
4. " " " " 150 psi	" " " "	197	188/174
5. " " " " 0 psi	H _{1.11.1} +I ₂ +E _{4.0}	198	188/194
6. " " " " 40 psi	" " " "	199	188/196
7. " " " " 150 psi	" " " "	200	188/196
8. Same with center post	H _{1.11.2} +I ₂ +E _{4.6}	201	188/200
9. 10.0" diam. 2.0" gap wide ch'd. shroud (150 psi)	H _{1.5.4} +E _{2.5.1}	177	156/176
<u>Effect of Wings and Misc.</u>			
1. Wings			
(a) Nacelle-mounted stub wing	H _{1.0} +W _{1.0} +E _{1.1}	178	181
(b) Single slotted flapped wing	H _{1.0} +W _{3.0} +E _{1.0}	180	181
(c) Double slotted flapped wing	H _{1.0} +W _{2.0} +E _{1.0}	179	181
(d) Boom-mounted stub wing	H _{1.0} +W _{4.0}	186	156
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
2. Crown Fairings			
(a) Flat top behind shaft	K ₁₁ +D ₁	140	138
(b) Round top behind shaft	K ₁₁ +D ₂	141	138
(c) Extended flat top fairing	H ₁ +D ₄	170	156
(d) Flat top + 16" cap, 4" gap	H _{1.7.2} +D ₄	171	170
(e) Forward fairing/nacelle fairing	P _{1.0}	152	156
3. Surface Devices			
(a) Vortex generators	K ₁₁ +VG _{2.1}	139	138
(b) Guidevane between nacelles	K ₁₁ +FV ₁	142	138
(c) Longitudinal strakes	H _{1.5.3} +S ₄	155	156
(d) 14% porosity spoiler	K ₁₁ +X ₁	143	138
*Basic Code is K13 unless noted otherwise.			

TABLE 2
LIST OF TEST RUNS
BASIC INVESTIGATIONS OF THE HUB WAKE

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
111	K ₁₁ /15" Long. wake traverse at TR center line	80	1433/0	8	6.0	-2.0	∞	Off
112	" /9" Vert. wake traverse above TR center line	"	"	"	"	"	"	"
113	" /2" Vert traverse through MR vortex	"	"	"	"	"	"	"
114	" /8" Vert. traverse below TR center line	"	"	"	"	"	"	"
115	" /13" Vert. traverse behind stabilizer	"	"	"	"	"	"	"
116	" /Lateral traverse - left stabilizer	"	"	"	"	"	"	"
117	" /116 continued	"	"	"	"	"	"	"
118	" /116 continued	"	"	"	"	"	"	"
119	" /Lateral traverse - right stabilizer	"	"	"	"	"	"	"
121	K ₁₁ +T ₂ /Effect of tail rotor flow on wake	"	1433/4500	"	"	"	"	On
135	K ₁₁ /Wake in 900 fpm climb	"	"	"	-6.0	-4.5	"	Off
136	" /Wake in 800 fpm descent	"	"	"	6.0	-2.0	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
137	K ₁₁ -H _{1.0} +H _{1.2} /Effect of 7.6 inch diam. solid hub cap	80	1433/0	8	6	-3.8	∞	Off
138	K ₁₁ /Repeat of base run	"	"	"	"	"	"	"
139	K ₁₁ +VG _{2.1} /Effect of vortex generators on aft crown	"	"	"	"	"	"	"
140	K ₁₁ +D ₁ /Flat-topped "doghouse" fairing on aft crown	"	"	"	"	"	"	"
141	K ₁₁ +D ₂ /Rounded-top fairing	"	"	"	"	"	"	"
142	K ₁₁ +FV ₁ /Deflection vane on crown between nacelles	"	"	"	"	"	"	"
143	K ₁₁ +X ₁ /Variable porosity spoiler	"	"	"	"	"	"	"
149	K ₁₃ +H _{1-N₁} /Effect of nacelles off also add stiff pitch arms (K ₁₃)	60	1075/0	4.5	"	"	"	"
150	K ₁₃ +H ₁ /60 knot baseline	"	"	"	"	"	"	"
151	K ₁₃ +H _{1.3} /16 inch diam. helmet fairing	"	"	"	"	"	"	"
152	K ₁₃ +P _{1.0} /Pylon and intake fairings	80	1433/0	8	"	"	"	"
153	K ₁₃ +H _{1.2} /Repeat 137 with K ₁₃ pitch arms	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT.	TAIL ROTOR
					α°	ψ°		
154	K ₁₃ +H _{1.5.2} /10" open hub cap, 7" underbody, 1.25" gap	80	1433/0	8	6	-3.8	∞	Off
155	K ₁₃ +H _{1.5.2} +S ₄ /Same as 154 except strakes on aft crown	"	"	"	"	"	"	"
156	K ₁₃ +H _{1.0} /Baseline with K ₁₃ , i.e., stiff pitch arms	"	"	"	"	"	"	"
158	K ₁₃ -M+H _{1.0} /Wake studies with blades off, hub not rotating	"	0/0	"	"	"	"	"
159	K ₁₃ -M-H _{1.0} /Wake studies with hub off	"	"	"	"	"	"	"
160	K ₁₃ -M+H _{1.0} /Same as 158 except hub is rotating	"	1433/0	"	"	"	"	"
161	K ₁₃ -M+H _{1.5.2} /Repeat of 154 without blades	"	0/0	"	"	"	"	"
162	K ₁₃ -M+H _{1.5.3} /Same as 161 except 4" gap	"	"	"	"	"	"	"
163	K ₁₃ -M+H _{1.5.4} /Same as 161 except 2" gap	"	"	"	"	"	"	"
164	K ₁₃ -M+H _{1.5.1} /Same as 161 except 0.5" gap	"	"	"	"	"	"	"
165	K ₁₃ -M+H _{1.0.1} /10" open hub cap, no underbody, same cap vert. position as Run 154	"	"	"	"	"	"	"
166	K ₁₃ -M+H _{1.0.2} /Same as 165 with cap lowered by 0.5"	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
167	K ₁₃ -M+H _{1.7.1} /16" open cap, no underbody, 2" gap	80	0/0	8	6	-3.8	∞	Off
168	K ₁₃ +H _{1.7.1} /Blades on, same cap config. as 167	"	1433/0	"	"	"	"	"
169	K ₁₃ +H _{1.7.2} /16" open cap, no underbody, 4" gap	"	"	"	"	"	"	"
170	K ₁₃ +H _{1.0} +D _{4.0} /Extended flat top fairing on aft crown	"	"	"	"	"	"	"
171	K ₁₃ +H _{1.7.2} +D _{4.0} /Same fairing as 170, same cap as 169	"	"	"	"	"	"	"
172	K ₁₃ +H _{1.0} +E _{1.0} (0psi)/Basic air ejector zero blowing baseline	"	"	"	"	"	"	"
173	K ₁₃ +H _{1.0} +E _{1.0} (40 psi)/Same as 172 with 40 psi supply	"	"	"	"	"	"	"
174	K ₁₃ +H _{1.0} +E _{1.0} (150 psi)/Same as 172 with 150 psi supply	"	"	"	"	"	"	"
175	K ₁₃ +H _{1.0} +E _{2.5.1} (40 psi)/Ejector with wide chord shroud at 40 psi	"	"	"	"	"	"	"
176	K ₁₃ +H _{1.0} +E _{2.5.1} (150 psi)/Same as 174 with 150 psi supply	"	"	"	"	"	"	"
177	K ₁₃ +H _{1.5.4} +E _{2.5.1} (150 psi)/Same as 176 with 10" cap like 163	"	"	"	"	"	"	"
178	K ₁₃ +H _{1.0} +W _{1.0} +E _{1.1} (0 psi)/Nacelle mounted wing	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
179	K13+H1.0+W2.0+E1.0 (0 psi)/Double slotted flapped wing	80	1433/0	8	6	-3.8	∞	Off
180	K13+H1.0+W3.0+E1.0 (0 psi)/Single slotted flapped wing	"	"	"	"	"	"	"
181	K13+H1.0+E1.2 (0 psi)/Baseline with ejector tube moved aft	"	"	"	"	"	"	"
182	K13+H1.9.0+E1.2 (0 psi)/Standard 10" frisbee	"	"	"	"	"	"	"
183	K13+H1.9.1+E1.2 (0 psi)/16" fabricated frisbee	"	"	"	"	"	"	"
184	K13+H1.0+E3.5.2 (40 psi)/Wide chord with lip at 40 psi	"	"	"	"	"	"	"
185	K13+H1.0+E3.5.2 (150 psi)/Same as 184 with 150 psi air	"	"	"	"	"	"	"
186	K13+H1.0+W4.0/Boom mounted stub wing	"	"	"	"	"	"	"
187	K13+H1.0+E3.5.4 (150 psi)/Like 185 with modified shroud	"	"	"	"	"	"	"
188	K13+H1.0+I1+E1.0 (0 psi)/Baseline with I ₁ instr. ring	"	"	"	"	"	"	"
189	K13+H1.8.1+I1+E1.0 (0 psi)/Solid cap, 10" diam. 3.25" height	"	"	"	"	"	"	"
190	K13+H1.8.2+I1+E1.0 (0 psi)/Same as 190 except + 4.12" height	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
191	K ₁₃ +H _{1.0.2} +I ₁ +E _{1.0} (0 psi)/10" cap, no underbody, 1.87" gap	80	1433/0	8	6	-3.8	∞	Off
193	K ₁₃ +H _{1.0.2} +I ₁ +E _{1.0} (0 psi)/10" cap, no underbody, 1.25" gap	"	"	"	"	"	"	"
194	K ₁₃ +H _{1.11.1} +I ₂ +E _{1.0} (0 psi)/7.6" cap, underbody, 1.25" gap	"	"	"	"	"	"	"
195	K ₁₃ +H _{1.11.1} +I ₂ +E _{1.0} (20 psi)/Same as 194 with 20 psi air	"	"	"	"	"	"	"
196	K ₁₃ +H _{1.11.1} +I ₂ +E _{1.0} (40 psi)/Same as 194 with 40 psi air	"	"	"	"	"	"	"
197	K ₁₃ +H _{1.11.1} +I ₂ +E _{1.0} (150 psi)/Same as 194 with 150 psi air	"	"	"	"	"	"	"
198	K ₁₃ +H _{1.11.1} +I ₂ +E _{4.0} (0 psi)/Same as 194 except blowing tube 2" aft	"	"	"	"	"	"	"
199	K ₁₃ +H _{1.11.1} +I ₂ +E _{4.0} (40 psi)/Same as 198 with 40 psi air	"	"	"	"	"	"	"
200	K ₁₃ +H _{1.11.1} +I ₂ +E _{4.0} (150 psi)/Same as 198 with 150 psi air	"	"	"	"	"	"	"
201	K ₁₃ +H _{1.11.2} +I ₂ +E _{4.0} (150 psi)/Same as 200 except center support cap	"	"	"	"	"	"	"
202	K ₁₃ +H _{1.11.2} +I ₂ /Baseline with I ₂ and no blowing tube	"	"	"	"	"	"	"
203	K ₁₃ +H _{1.0} +E _{5.0} (0 psi)/Bifurcated air duct baseline	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
204	K ₁₃ +H _{1.0} +E _{5.0} (150 psi)/Bifurcated duct with 150 psi air	80	1433/0	8	6	-3.8	∞	Off
205	K ₁₃ +H _{1.0} +E _{5.0} (40 psi)/Same as 204 with 40 psi air	"	"	"	"	"	"	"
207	K ₁₃ +H _{1.2.1} +I ₁ +E _{1.0} (0 psi)/7.6" solid cap, no gap	"	"	"	"	"	"	"
208	K ₁₃ +H _{1.2.2} +I ₁ +E _{1.0} (0 psi)/Same as 207 except 0.55" gap	"	"	"	"	"	"	"
210	K ₁₃ +H _{1.15.1} +I ₁ +E _{1.0} (0 psi)/Repeat of 189	"	"	"	"	"	"	"
211	K ₁₃ +H _{1.14.1} +I ₁ +E _{1.0} (0 psi)/Like 189 and 210 except cap is open	"	"	"	"	"	"	"

TABLE 3					
INDEX TO RAKE POSITIONS					
RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
111	20	53.5	103.1	-7.25	1
	21	"	"	"	
	22	"	105.0	"	
	24	"	107.0	"	
	26	"	109.0	"	
	28	"	111.0	"	
	30	"	112.9	"	
	32	"	114.9	"	
	34	"	116.9	"	
	36	"	118.9	"	
112	2	48.9	107.3	-7.25	1
	4	50.8	"	"	
	6	52.7	103.3	"	
	8	54.5	"	"	
	10	56.2	"	"	
	12	57.2	"	"	
113	2	51.7	103.3	-3.25	1
	4	52.3	"	"	
	6	52.8	"	"	
	8	53.3	"	"	
	10	53.9	"	"	
	11	53.3	"	"	
114	2	44.5	103.0	-3.25	1
	4	46.4	"	"	
	6	48.2	"	"	
	8	50.0	"	"	
	10	51.9	"	"	
115	3	52.9	124.7	-3.25	1
	4	52.0	"	"	
	6	50.0	"	"	
	9	48.0	"	"	
	10	46.0	"	"	
	12	44.1	"	"	
	14	42.1	"	"	
	16	53.0	"	"	
	18	54.0	"	"	
	20	55.0	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
116	7	36.9	100.5	-17.5	1
117	2 4 6 8 10	37.6 " 37.3 " "	100.5 " 99.6 " "	-16.0 -14.0 -12.0 -10.0 - 8.0	1
118	2	37.6	100.5	- 6.0	1
119	2 5 8 9 14 16 20 25	37.3 " " " " " 51.5 52.3	99.6 " " " " " 102.5 101.7	+ 6.0 8 10 " 14 16 17.5 -17.5	1
121	3 4 6 8 10	62.9 53.5 50.1 46.0 42.1	129.0 " " " "	+ 5.7 " " " "	2
135	2 4 6 8 10 12 14	56.9 54.5 52.5 50.5 48.5 46.5 44.5	106.3 " " " " " "	- 5.7 " " " " " "	3
136	2 4 6 8 10 12 14 17 18 19	56.5 54.5 52.5 50.6 48.5 46.5 44.5 37.1 39.0 41.0	104.0 " " " " " " " " "	- 8.0 " " " " " " " " "	4

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
137	3	38.7	98.4	- 8.0	5
	5	39.9	"	"	
	7	42.0	100.5	"	
	9	44.0	"	"	
	11	46.0	103.6	"	
	13	48.0	"	"	
	15	50.0	"	"	
	17	52.0	"	"	
	19	54.0	"	"	
138-41, 143	2	38.8	98.4	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.5	"	
	5	44.0	"	"	
	6	46.0	103.6	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
142	7	37.8	98.4	- 8.0	5
	8	"	"	"	
	9	40.2	"	"	
	10	42.0	100.5	"	
	11	44.0	"	"	
	12	46.0	103.6	"	
	13	48.0	"	"	
	14	50.0	"	"	
	15	52.0	"	"	
	16	54.0	"	"	
	17	56.8	"	"	

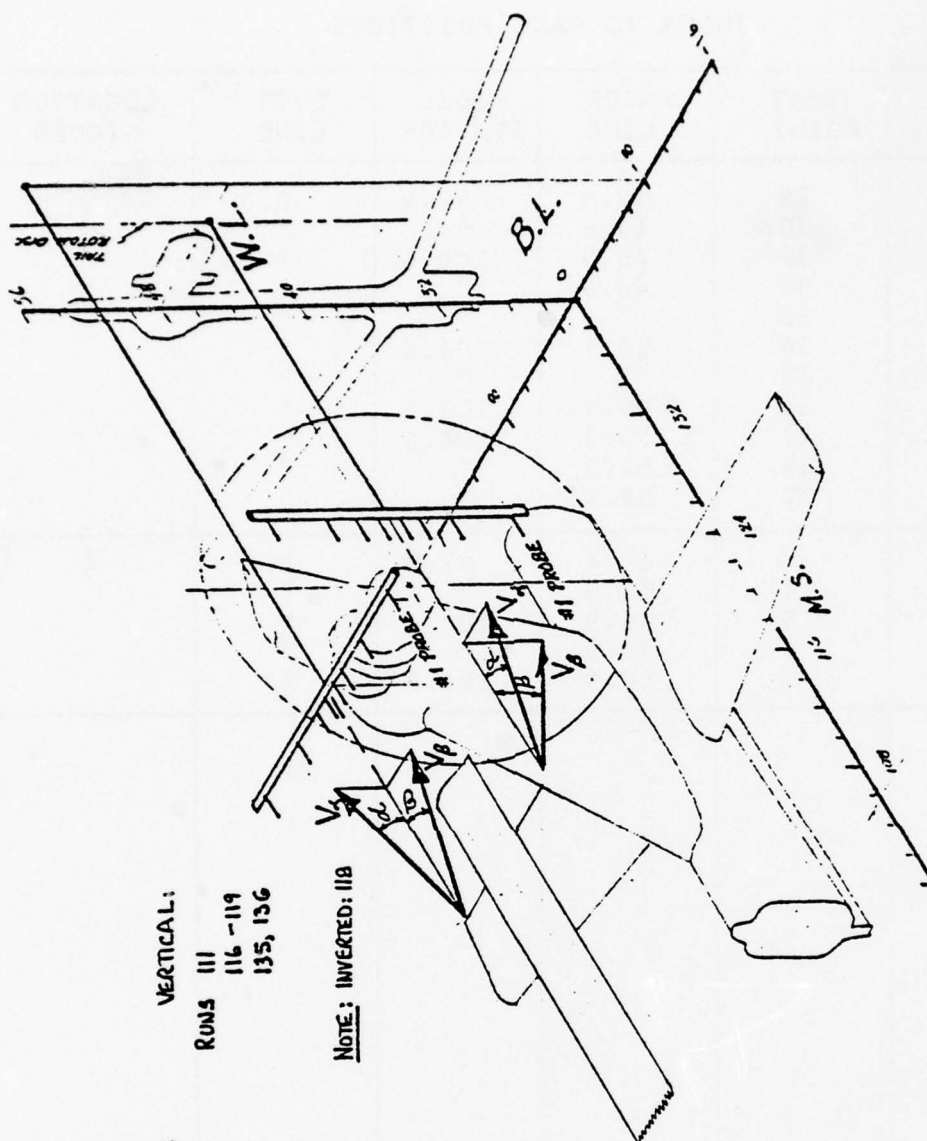
TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
149-151	2	38.8	98.5	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.6	"	
	5	44.0	"	"	
	6	46.0	103.5	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
152-6, 158 161-4, 166 167, 169-71 175, 177-9 180, 182, 184 186-8, 190 191, 193, 194 196, 198, 201 204, 207, 208 211	2	42.9	97.9	0.0	6
	3	44.9	"	"	
	4	46.9	100.6	"	
	5	48.9	"	"	
	6	50.9	104.6	"	
	7	52.9	"	"	
	8	54.9	"	"	
	9	56.9	"	"	
159	1	54.9	104.6	0.0	6
	2	52.9	"	"	
	3	50.7	"	"	
	4	48.6	100.6	"	
	5	46.7	"	"	
160, 203	5	42.9	97.9	0.0	6
	6	44.9	"	"	
	7	46.9	100.6	"	
	8	48.9	"	"	
	9	50.9	104.6	"	
	10	52.9	"	"	
	11	54.9	"	"	
165	3	44.9	97.9	0.0	6
	4	42.9	"	"	
	5	46.9	100.6	"	
	6	48.9	"	"	
	7	50.9	104.6	"	
	8	52.9	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
168, 183	4	42.9	97.9	0.0	6
	5	44.9	"	"	
	6	46.9	100.6	"	
	7	48.9	"	"	
	8	50.9	104.6	"	
	9	52.9	"	"	
	10	54.9	"	"	
172	3	42.9	97.9	0.0	6
	4	44.9	"	"	
	6	44.9	"	"	
	7	46.9	100.6	"	
	8	48.9	"	"	
	9	50.9	104.6	"	
	10	52.9	"	"	
	11	54.9	"	"	
173, 174, 176 185, 195, 197 199, 200, 205 210	1	42.9	97.9	0.0	6
	2	44.9	"	"	
	3	46.9	100.6	"	
	4	48.9	"	"	
	5	50.9	104.6	"	
	6	52.9	"	"	
	7	54.9	"	"	
181	2	42.9	97.9	0.0	6
	3	44.9	"	"	
	4	46.9	100.6	"	
	5	48.9	"	"	
	6	50.9	104.6	"	
	7	52.9	"	"	
	9	54.9	"	"	
	10	"	"	"	
	11	"	"	"	
	12	"	"	"	
	13	42.9	97.9	"	

TABLE 3 (CONTINUED)					
INDEX TO RAKE POSITIONS					
RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
189	29	42.9	97.9	0.0	6
	30	44.9	"	"	
	31	46.9	100.6	"	
	32	48.9	"	"	
	33	"	"	"	
	34	50.9	104.6	"	
	35	"	"	"	
	36	48.9	100.6	"	
	37	50.9	104.6	"	
	38	52.9	"	"	
	39	54.9	"	"	
202	3	43.4	97.9	0.0	6
	4	44.9	"	"	
	5	46.9	100.6	"	
	6	48.9	"	"	
	7	50.9	104.6	"	



VERTICAL:
 RUNS 111
 116-119
 135, 136

NOTE: INVERTED: 118

HORIZONTAL:
 RUNS 112-115
 121
 137-143
 148-156
 158-211

FIGURE 1 - RAKE ORIENTATION DIAGRAM

RUN 121

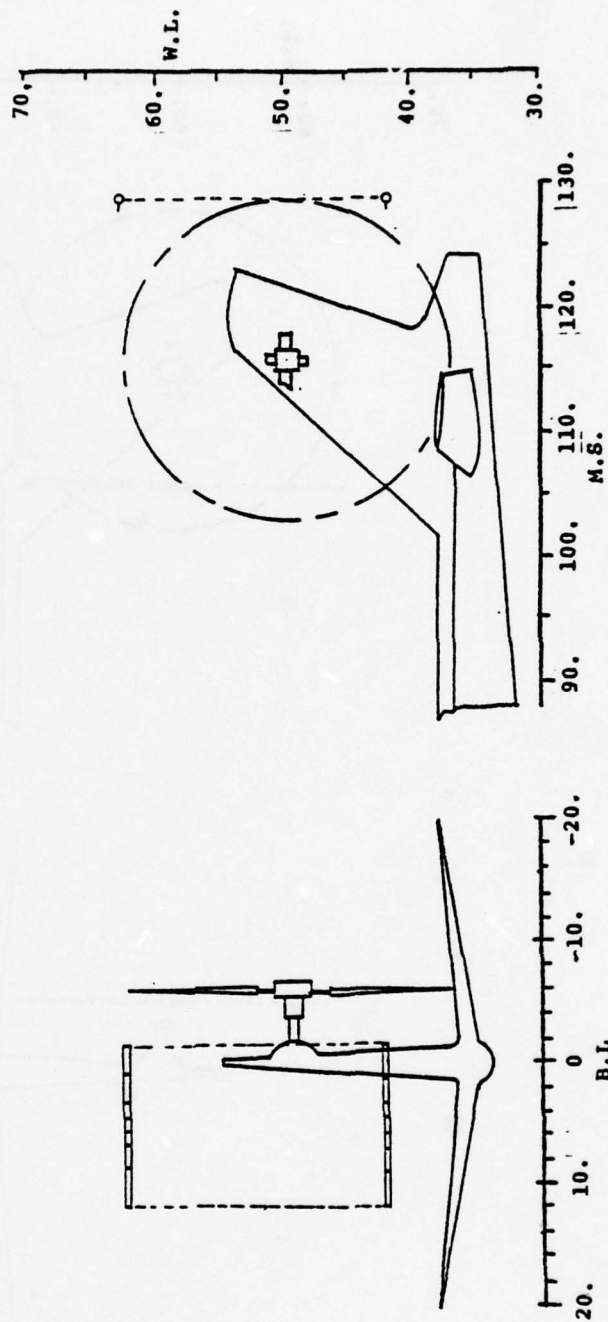


FIGURE 2 -HOT FILM RAKE LOCATIONS

RUN 135

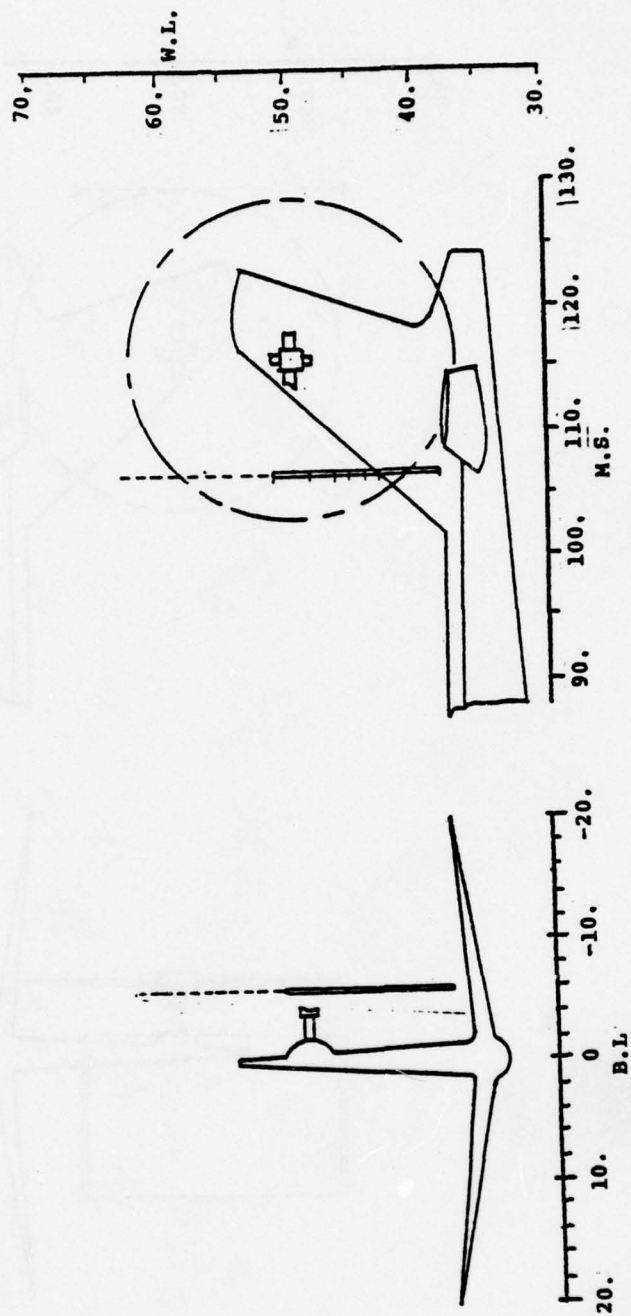


FIGURE 3 -HOT FILM RAKE LOCATIONS

RUN 136

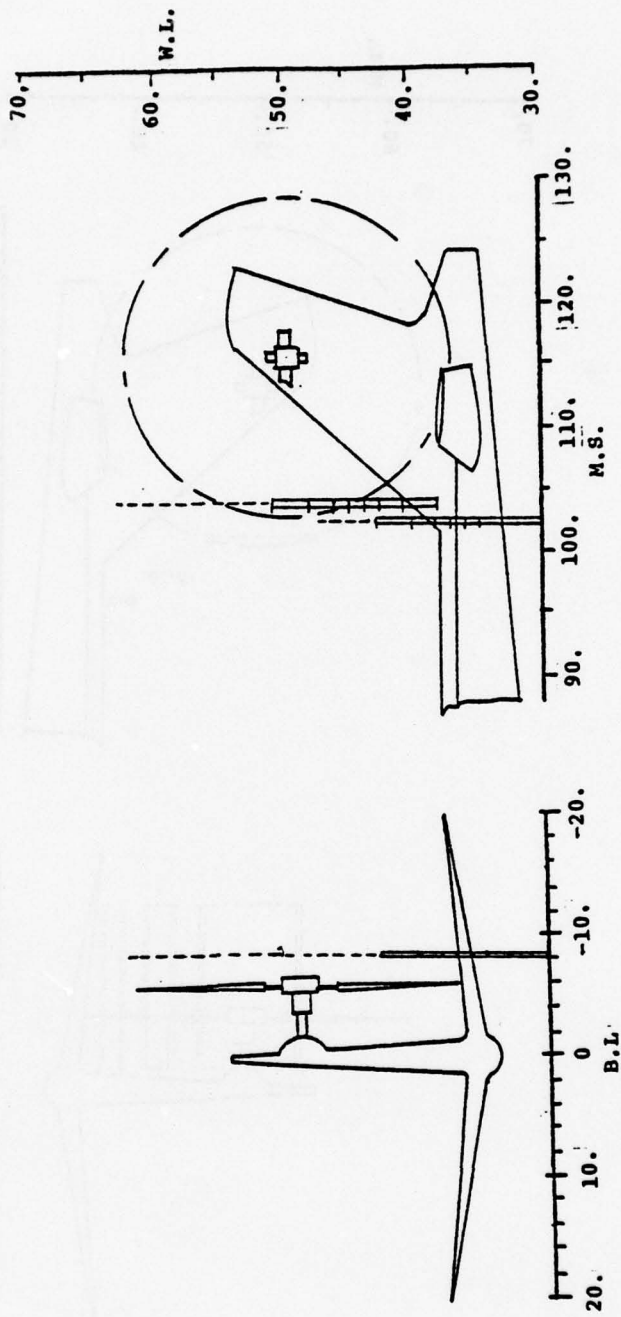


FIGURE 4 -HOT FILM RAKE LOCATIONS

RUN 137, 138, 139, 140, 141, 142,
143, 148, 149, 150, 151

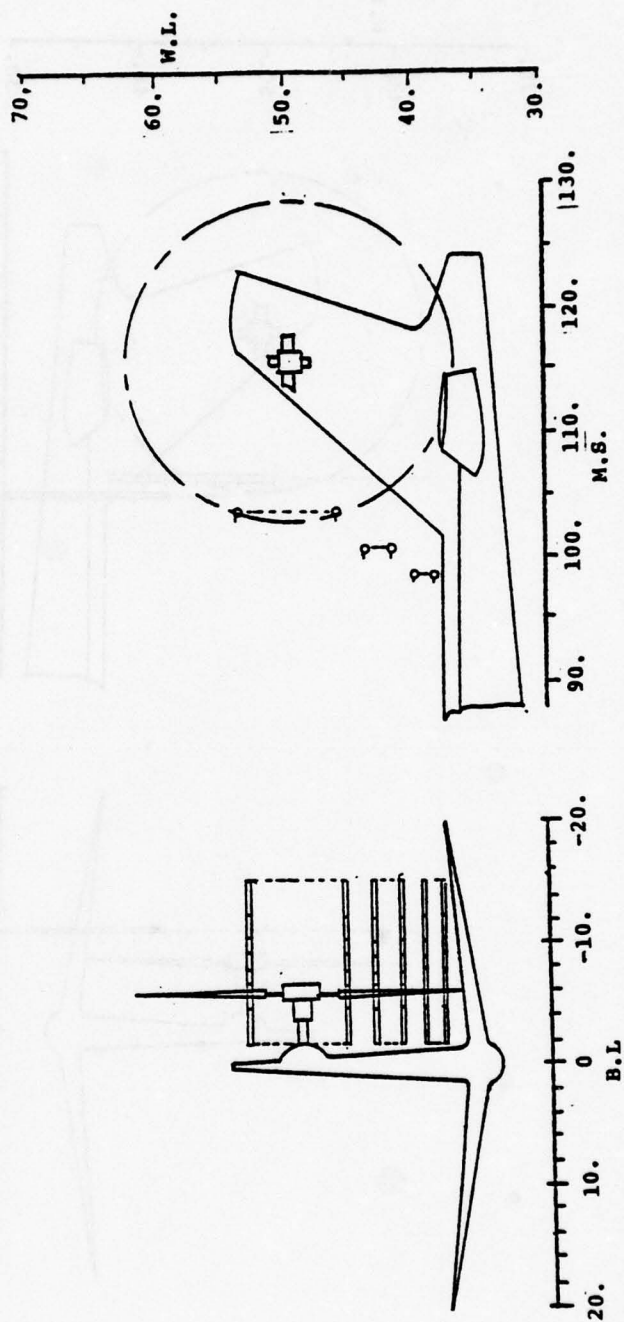


FIGURE 5 -HOT FILM RAKE LOCATIONS

RUN 152-156, 158-211

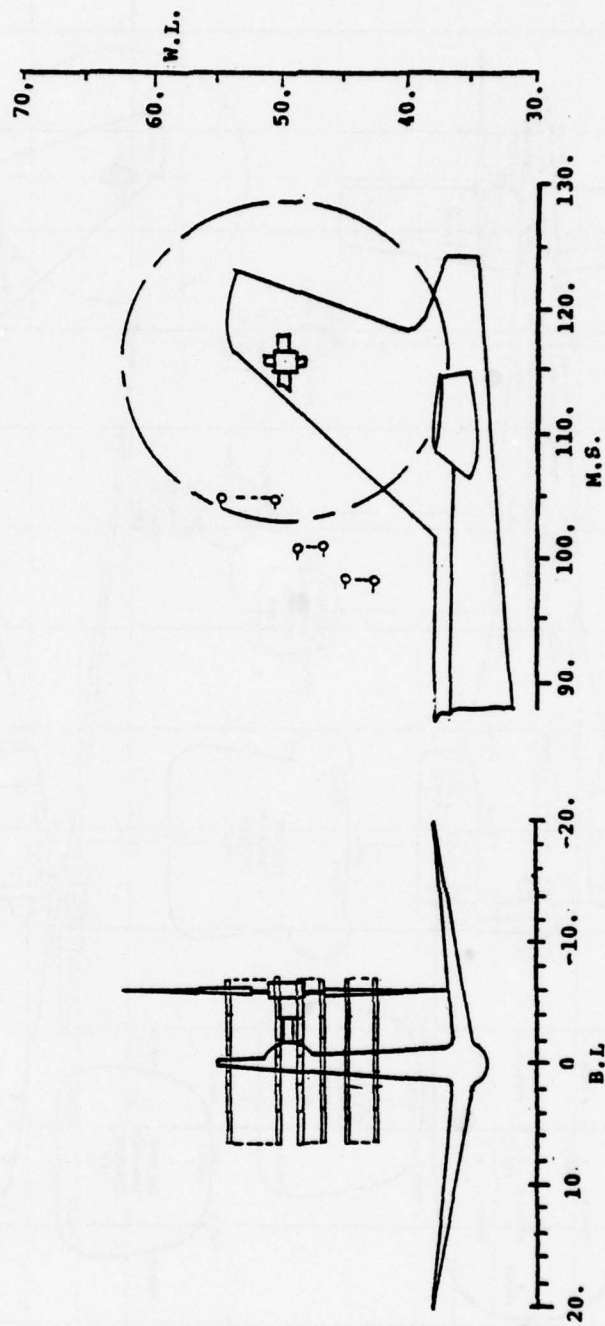


FIGURE 6 -HOT FILM RAKE LOCATIONS

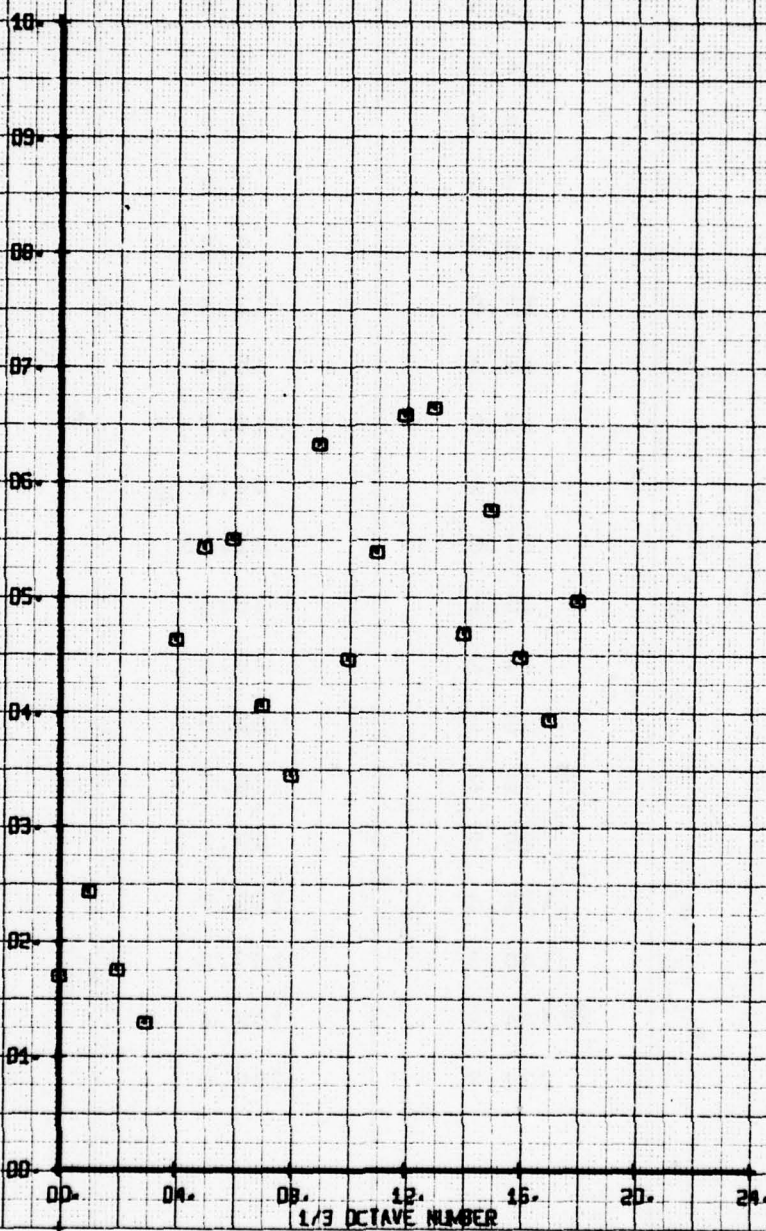
TABLE 4
1/3 OCTAVE BAND IDENTIFICATION

BAND NUMBER	BAND WIDTH - Hz		
	MINIMUM	CENTER	MAXIMUM
0	3.5	3.4	4.4
1	4.4	4.9	5.5
2	5.5	6.2	7.0
3	7.0	7.8	8.7
4	8.7	9.8	11.0
5	11.0	12.4	13.9
6	13.4	15.6	17.5
7	17.5	19.7	22.1
8	22.1	24.8	27.8
9	27.8	31.25	35.1
10	35.1	39.4	44.2
11	44.2	49.6	55.7
12	55.7	62.5	70.2
13	70.2	78.7	88.9
14	88.9	99.2	111.4
15	111.4	125.0	140.3
16	140.3	157.5	176.8
17	176.8	198.4	222.7
18	222.7	250.0	280.6

MIT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR. ACT OF SNAET
 RUN 140 TP 2

SYN CH PARAMETER
 01 56 ALPHA

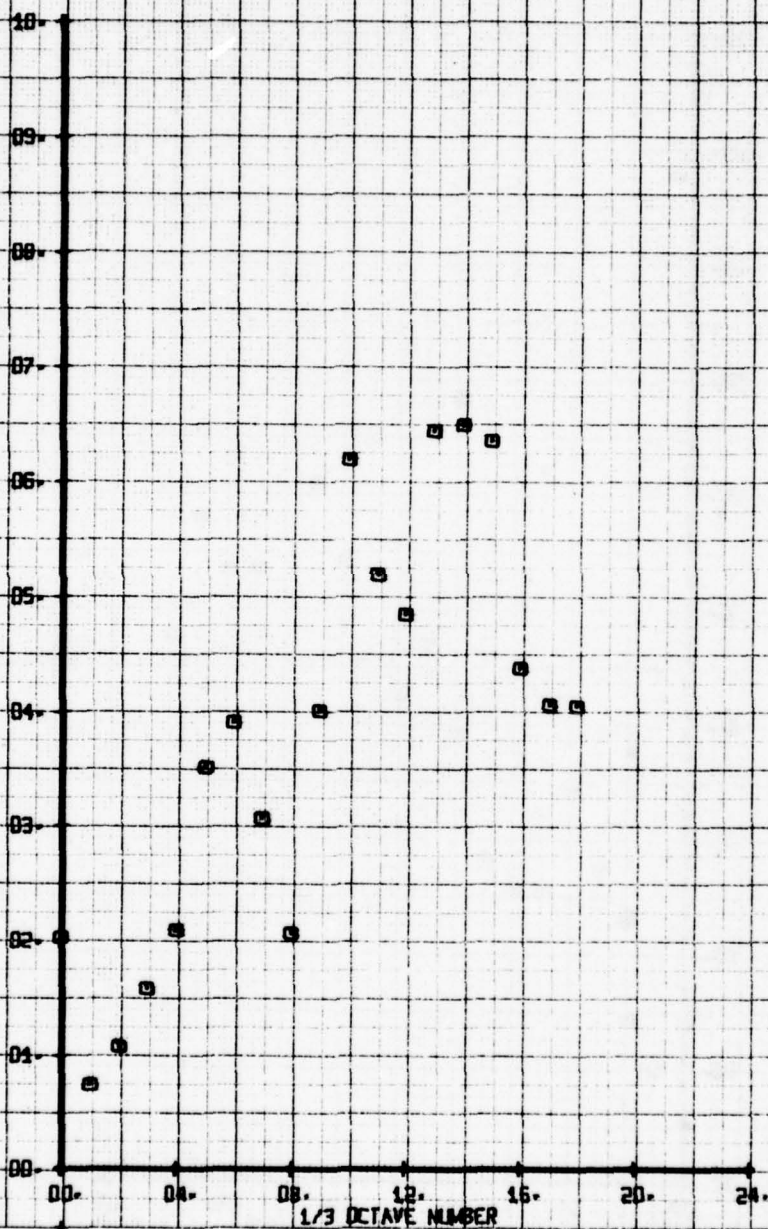
VERTICAL FLOW ANGLE, ALPHA - DEGREES



NET FILM WAVE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR, AFT OF SHAFT
 RUN 140 TP 3

LEGEND
 SYM CH PARAMETER
 @ 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

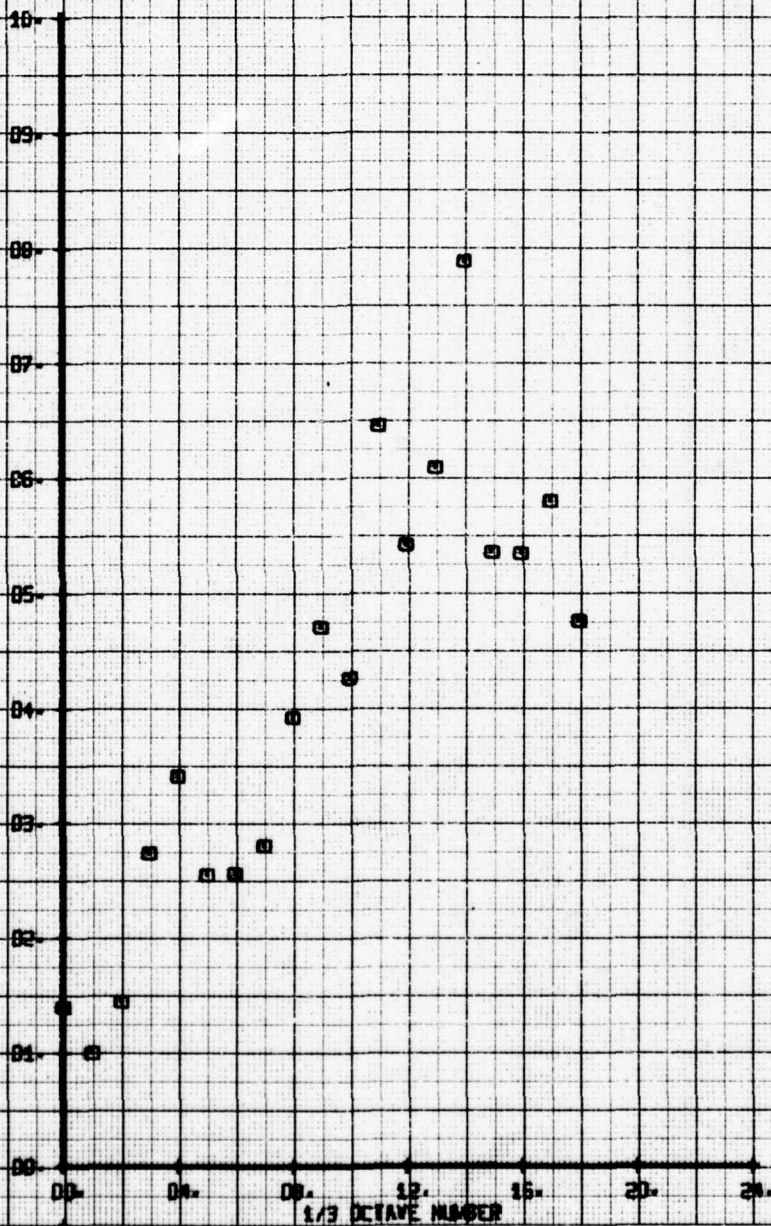


HOT FILM WARE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR, AFT OF SHAFT
 RUN 140 TP 4

SYM
 @

LEGEND
 CH
 66
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR. AFT OF SHAFT

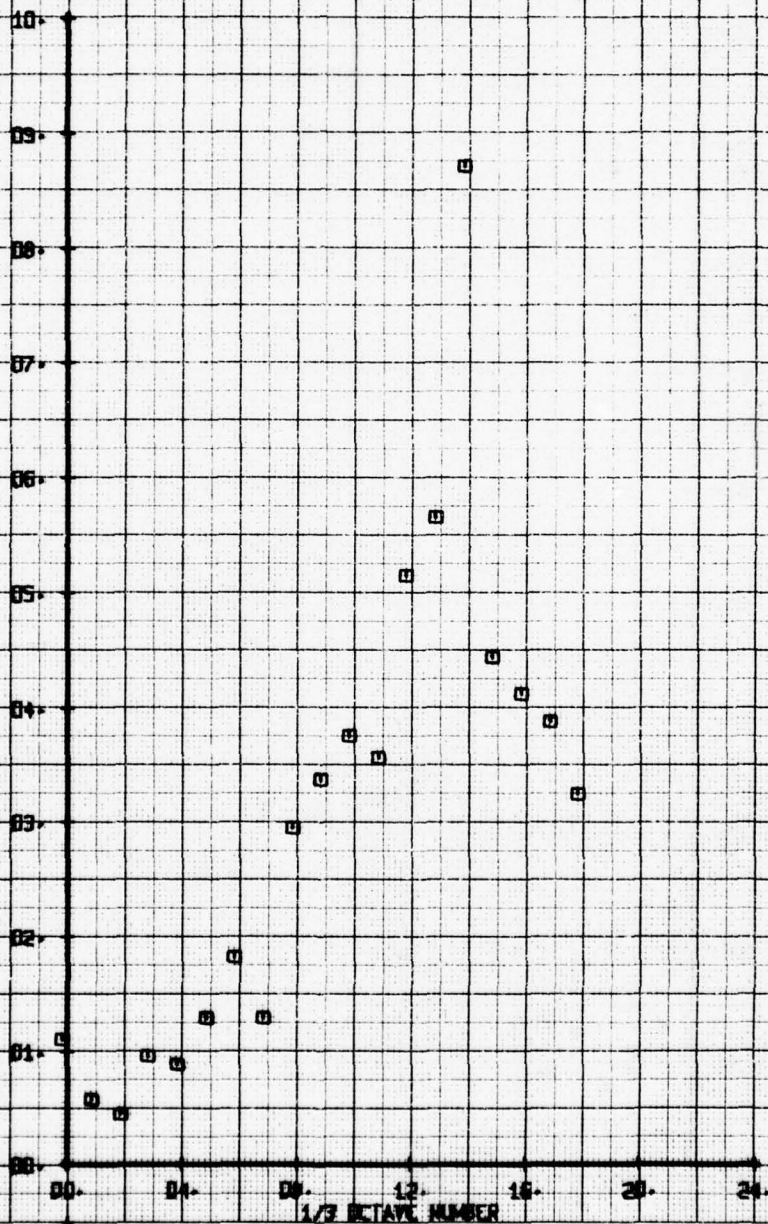
RUN 140 YF 5

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

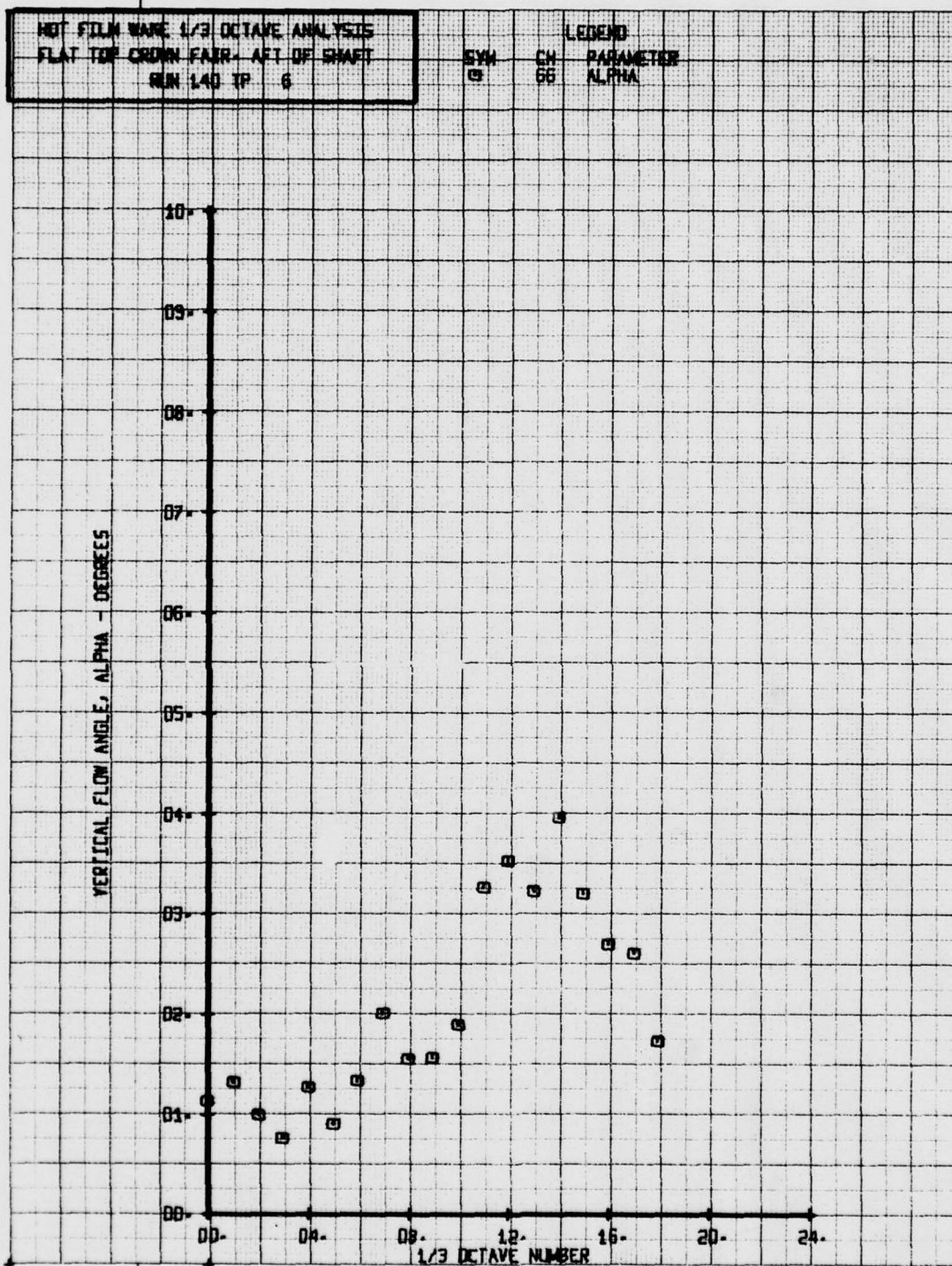


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR - AFT OF SHAFT
 RUN 140 TP 6

SYM
 @

CH
 66

LEGEND
 PARAMETER
 ALPHA



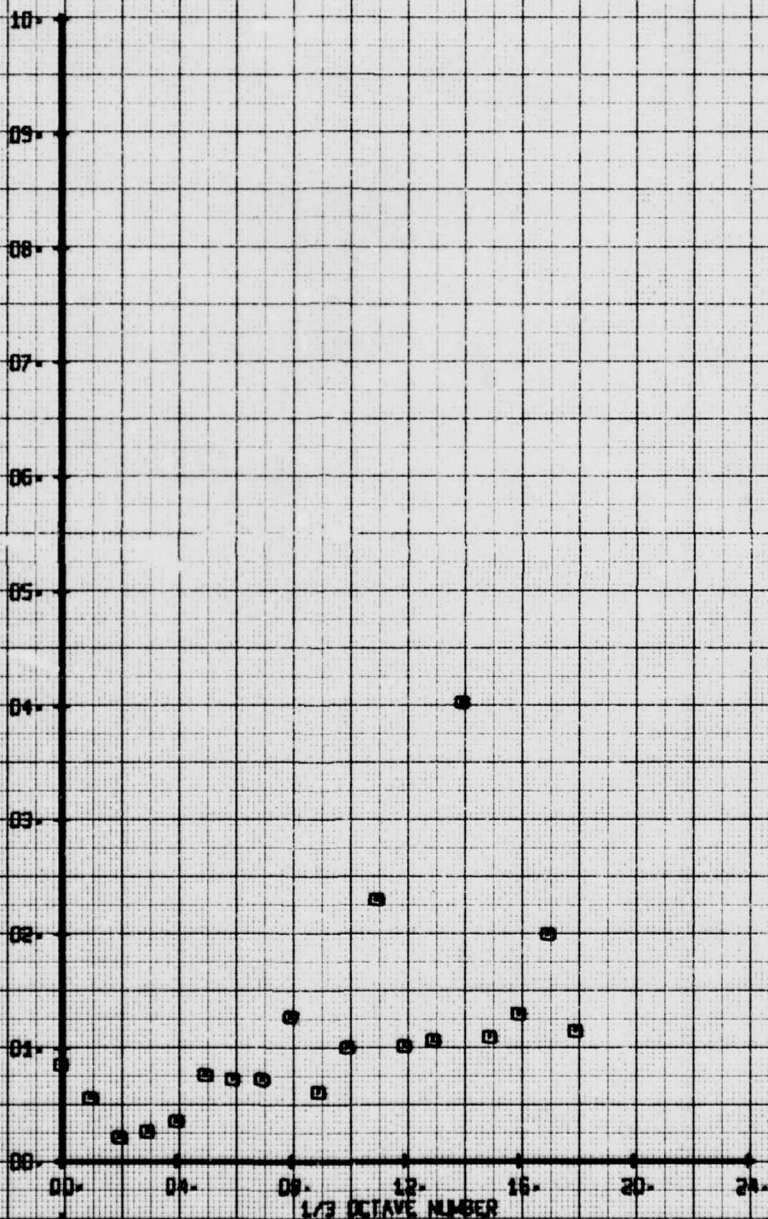
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR-AFT OF SHAFT
 RUN 140 TP 7

SYM
 6

CH
 66

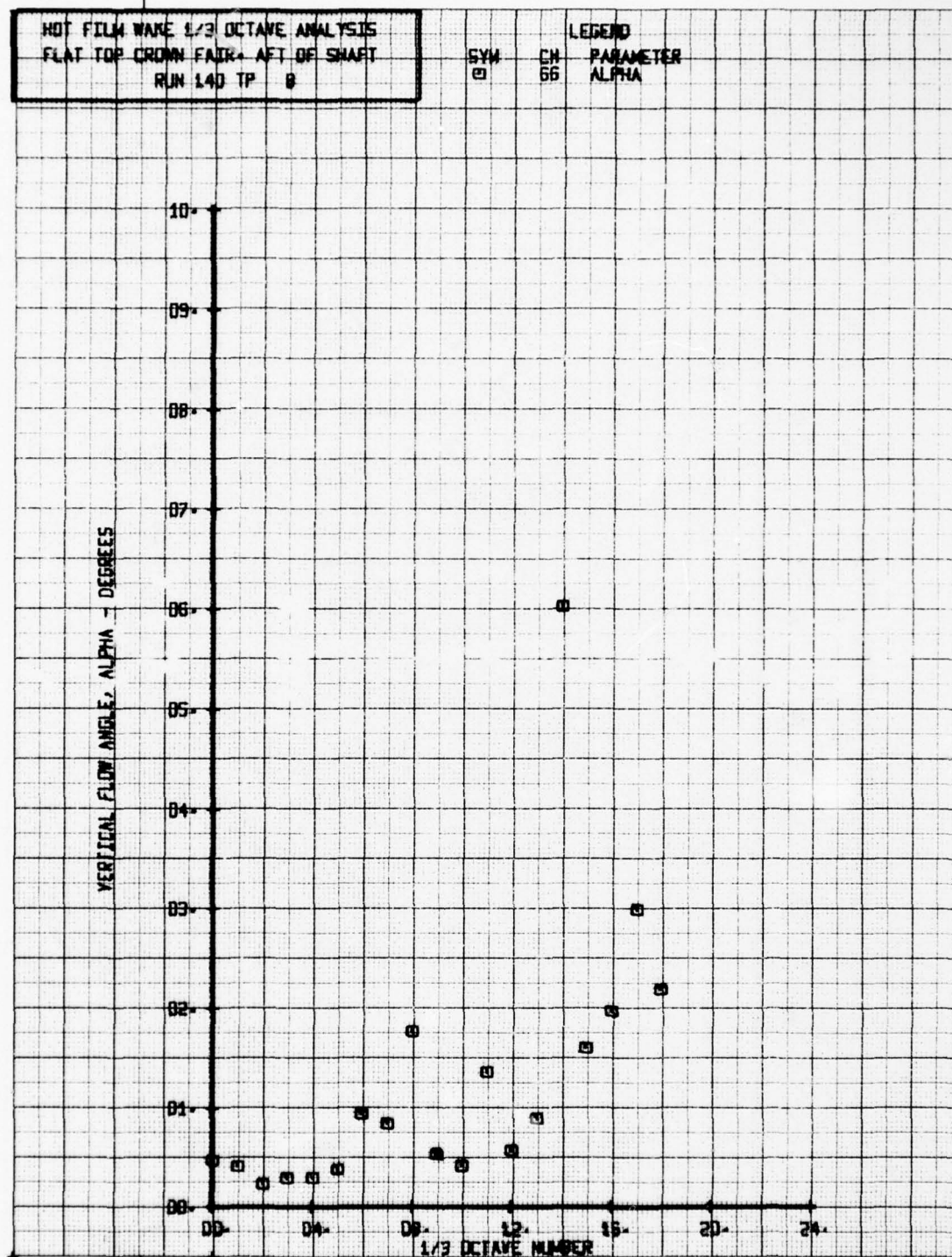
LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFT OF SHARP
 RUN 140 TP 8

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



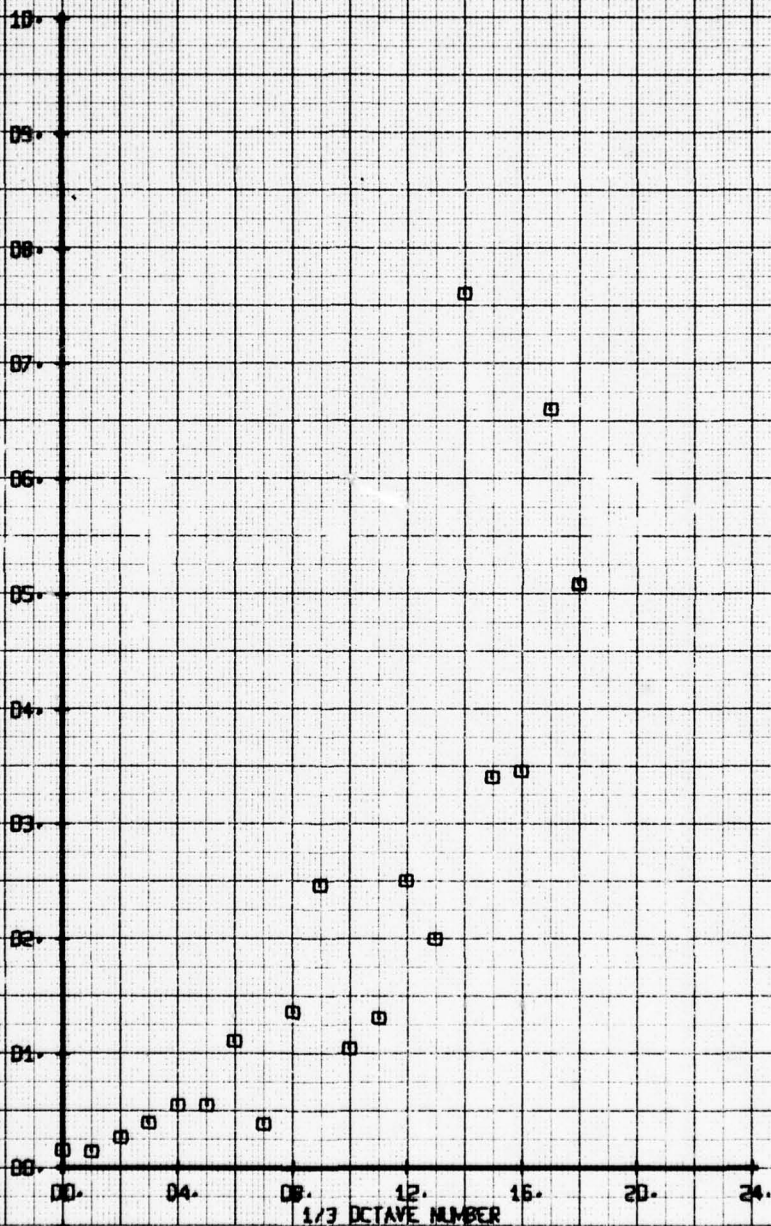
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFT OF SHIRT
 RUN 140 TP 9

SYM
 □

CN
 56

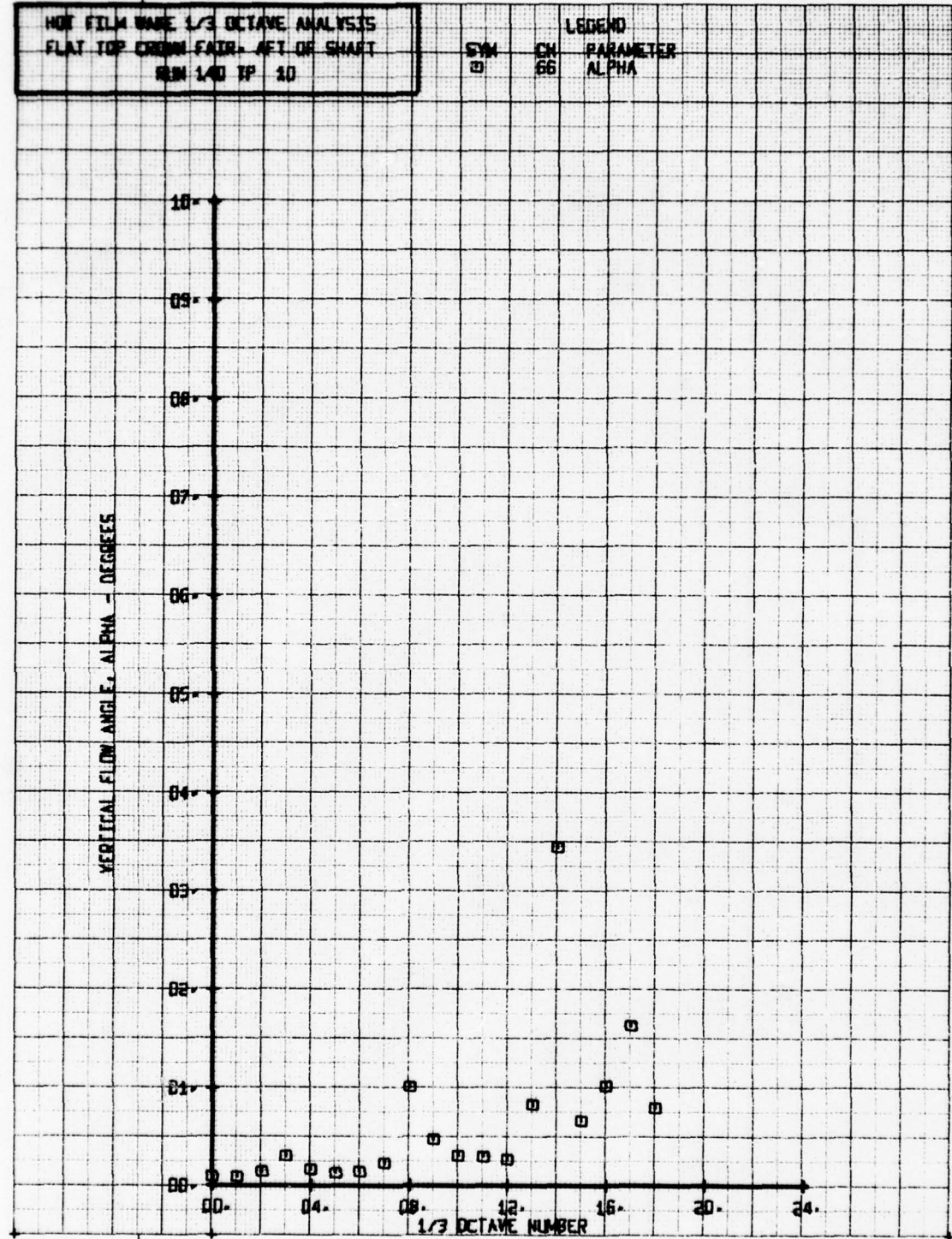
LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



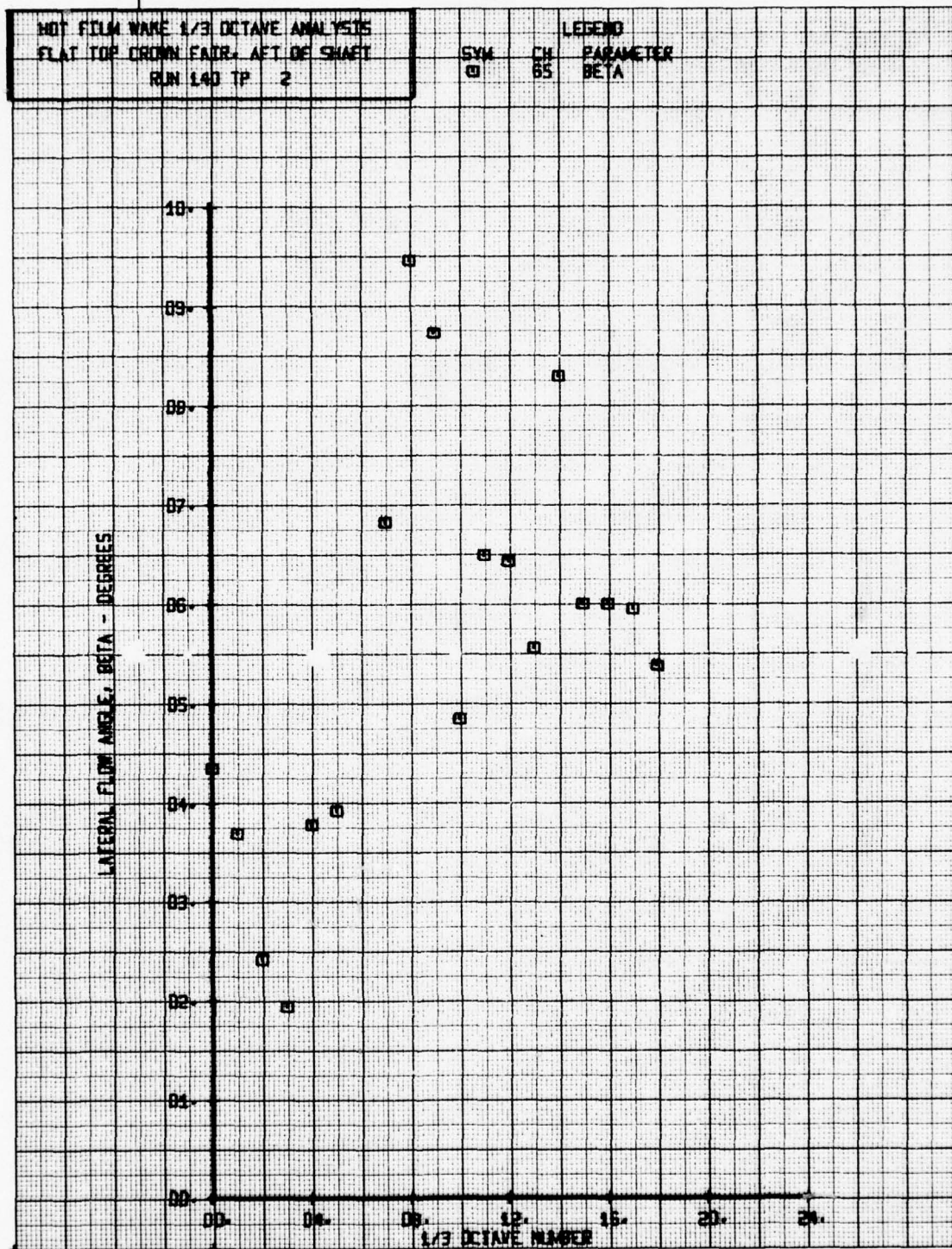
HOT FILM WIRE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIRLY SET OF SHIRT
 RUN 140 TP 10

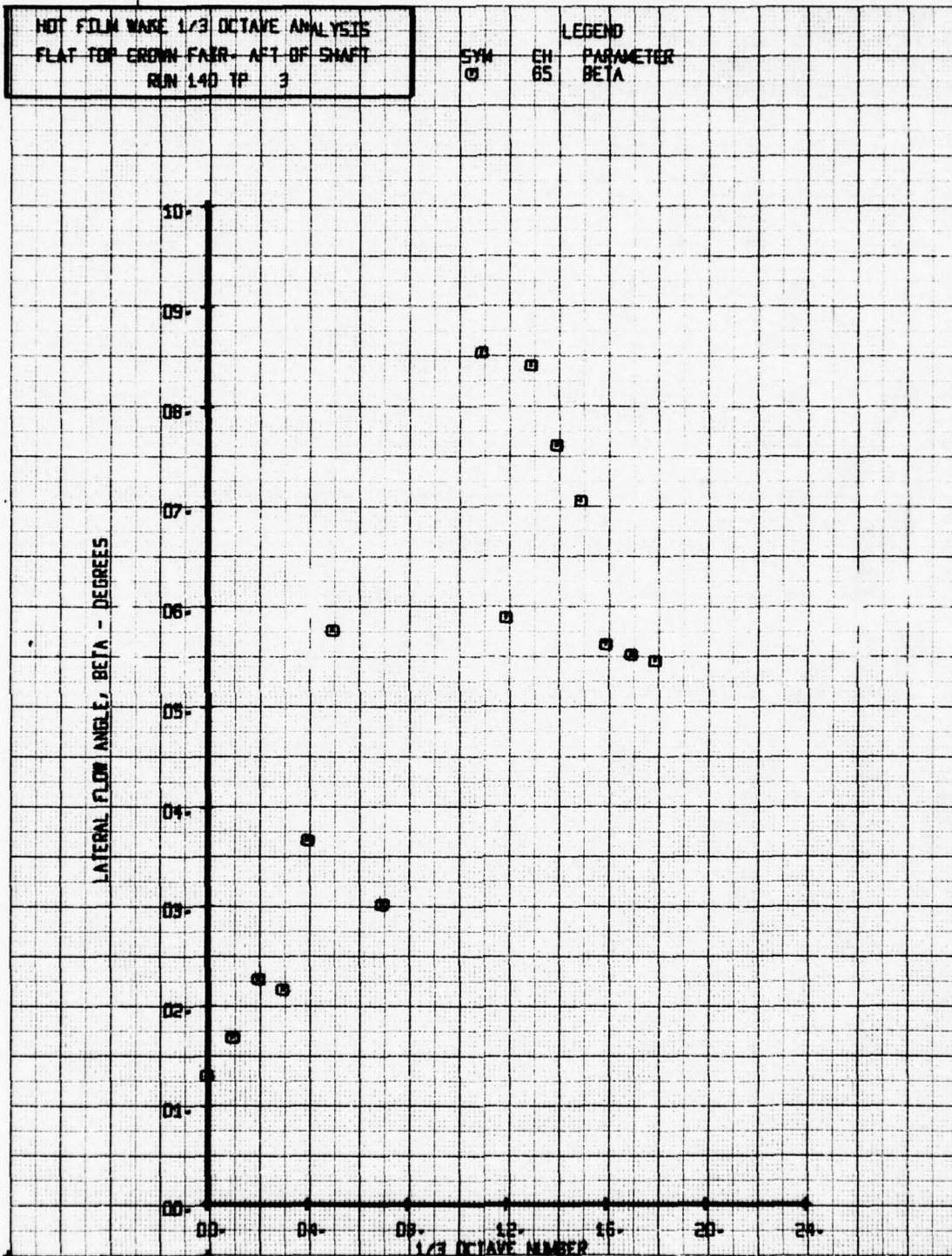
SYN	CH	LEGEND
0	66	PARAMETER ALPHA

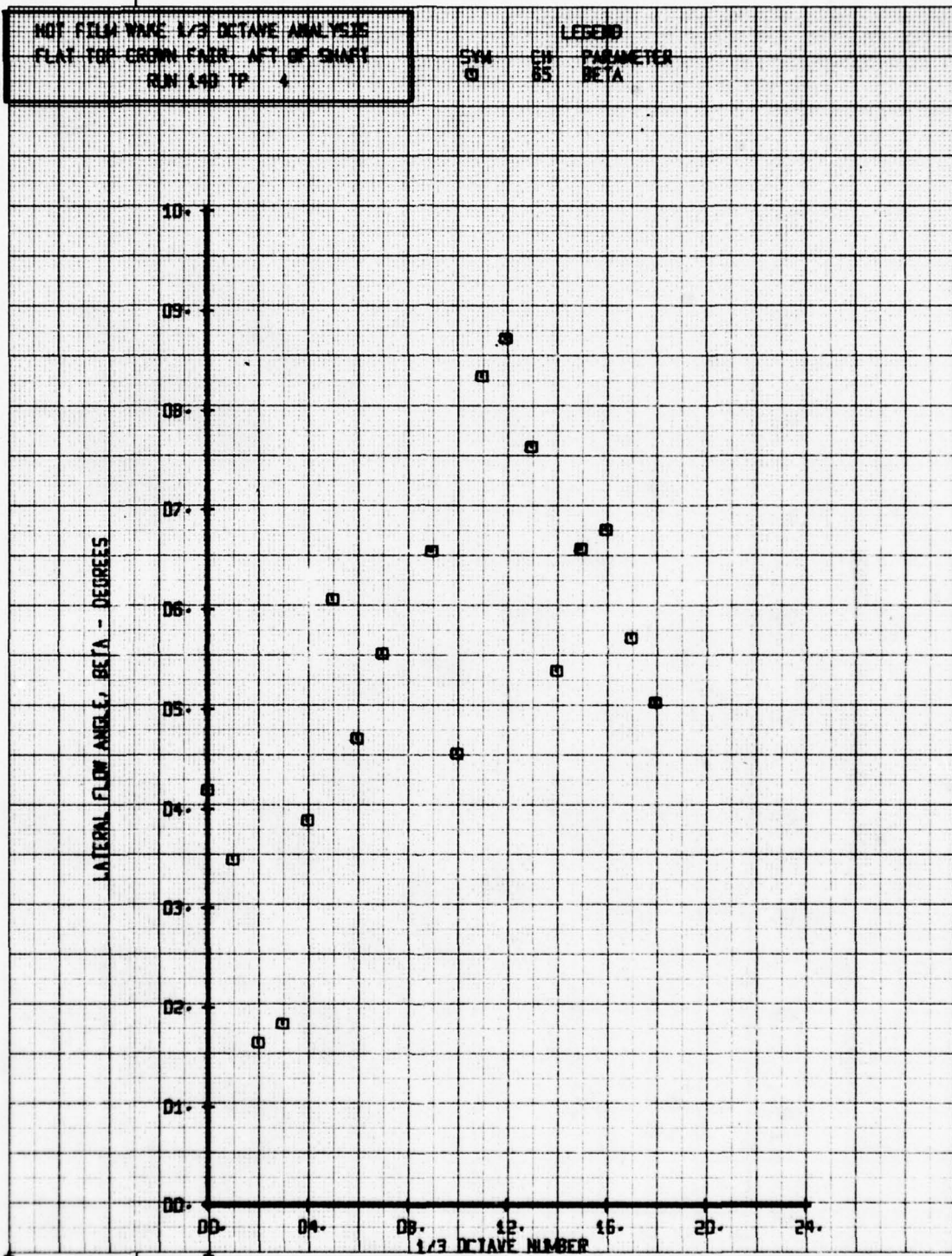


NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIRLY AFT OF SHAFT
 RUN 140 TP 2

SYM CH PARAMETER
 0 65 BETA







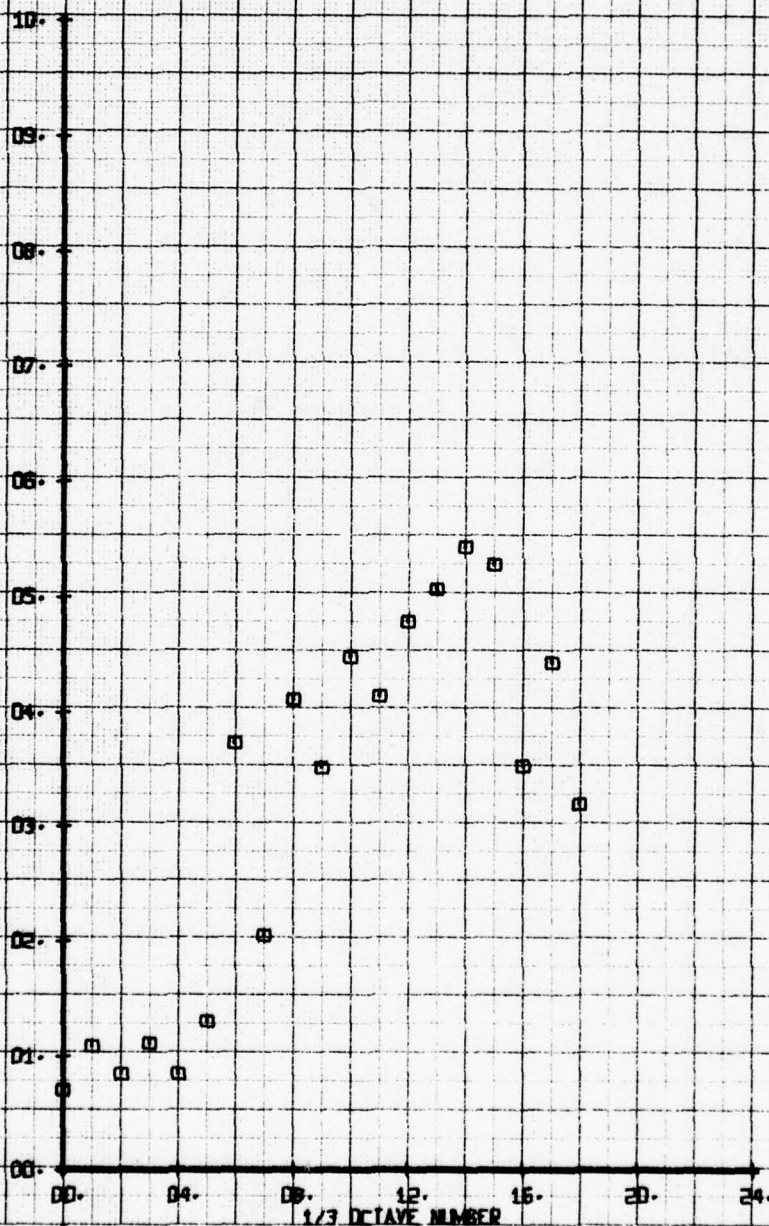
NOF FILM WAVE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR. AFT OF SHAF1
 RUN 140 TP 5

SYM
 01

EN
 05

LEGEND
 PARAMETER
 BETA

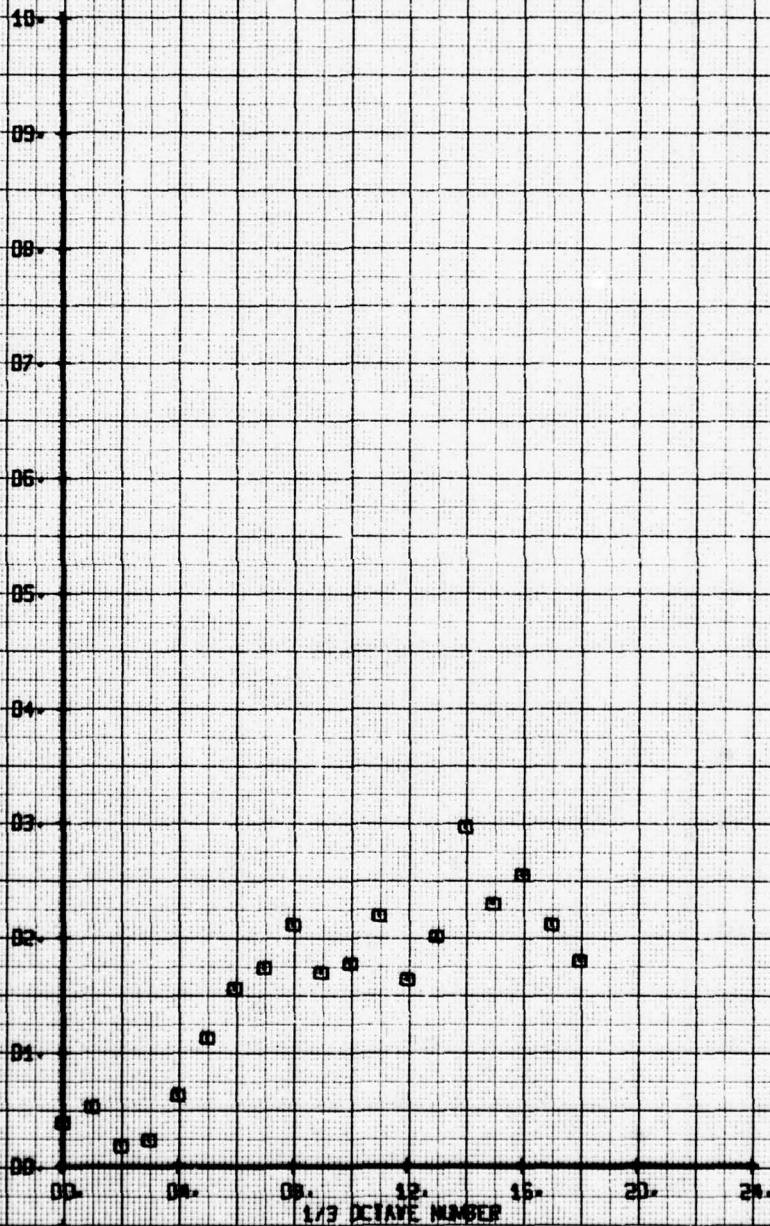
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR, AFT OF SHAFT
 RUN 140 TP 6

SYN CH PARAMETER
 01 65 BETA

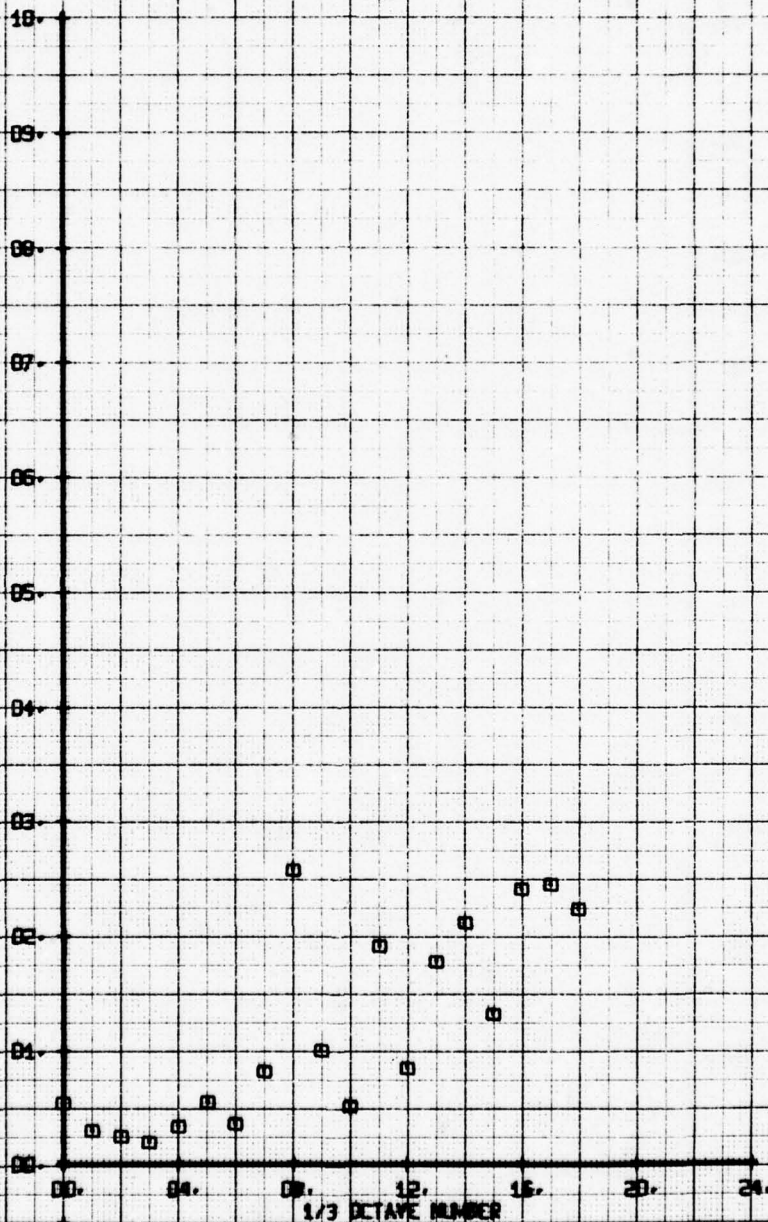
LATERAL FLOW ANGLE, BETA - DEGREES

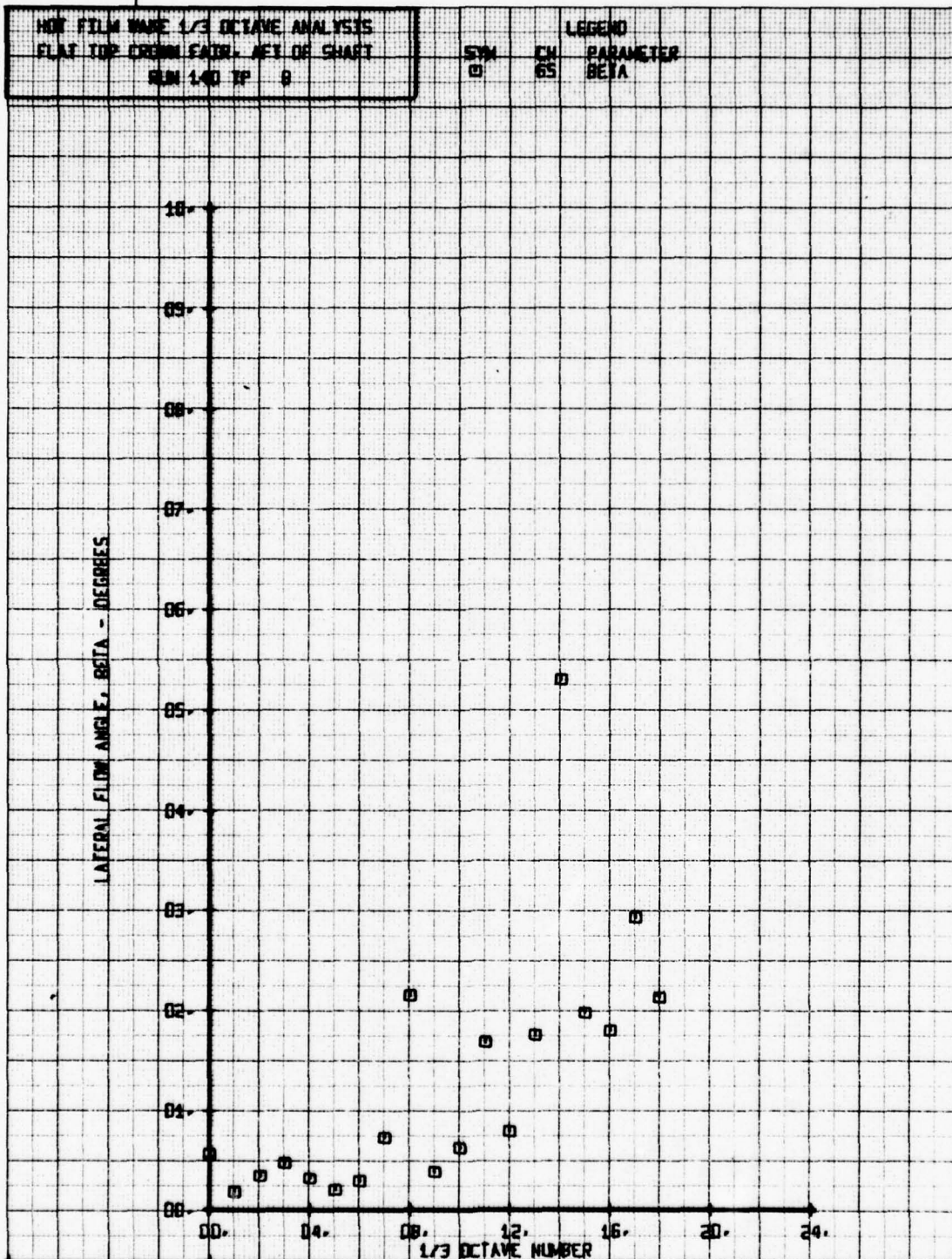


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR, AFT OF SHaft
 RUN 140 TP 7

SYN CH LEGEND
 0 65 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

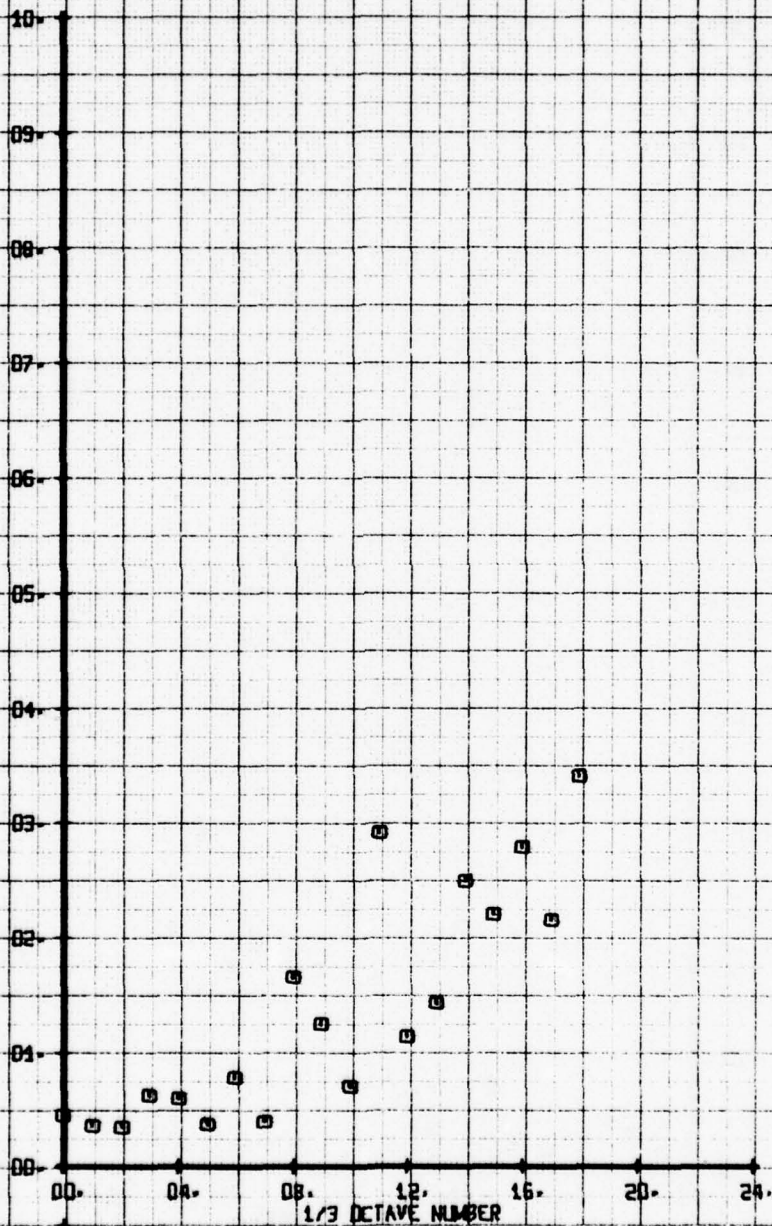




HOT FILM WIRE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR - AET DE SHAFT
 RUN 140 TP 9

LEGEND
 CH 65
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

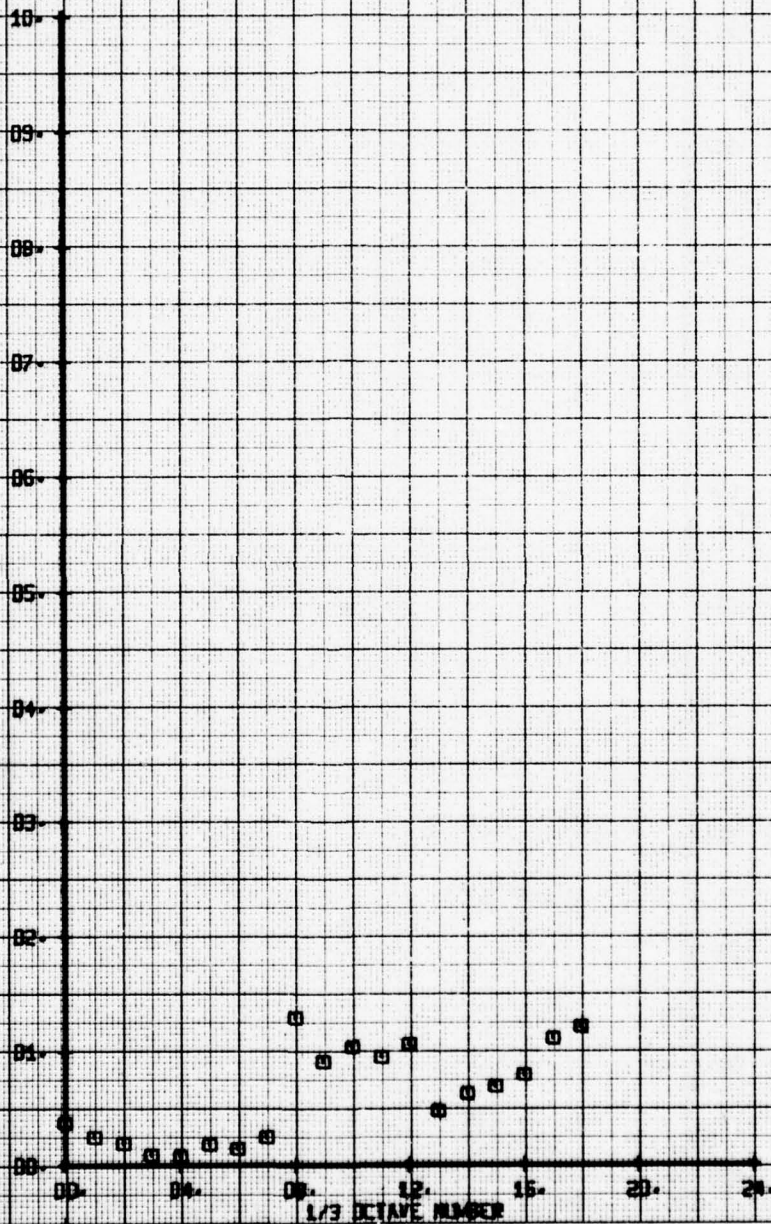


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIRLY AFT OF SHAFT
 RUN 140 TP 18

SYM
 □

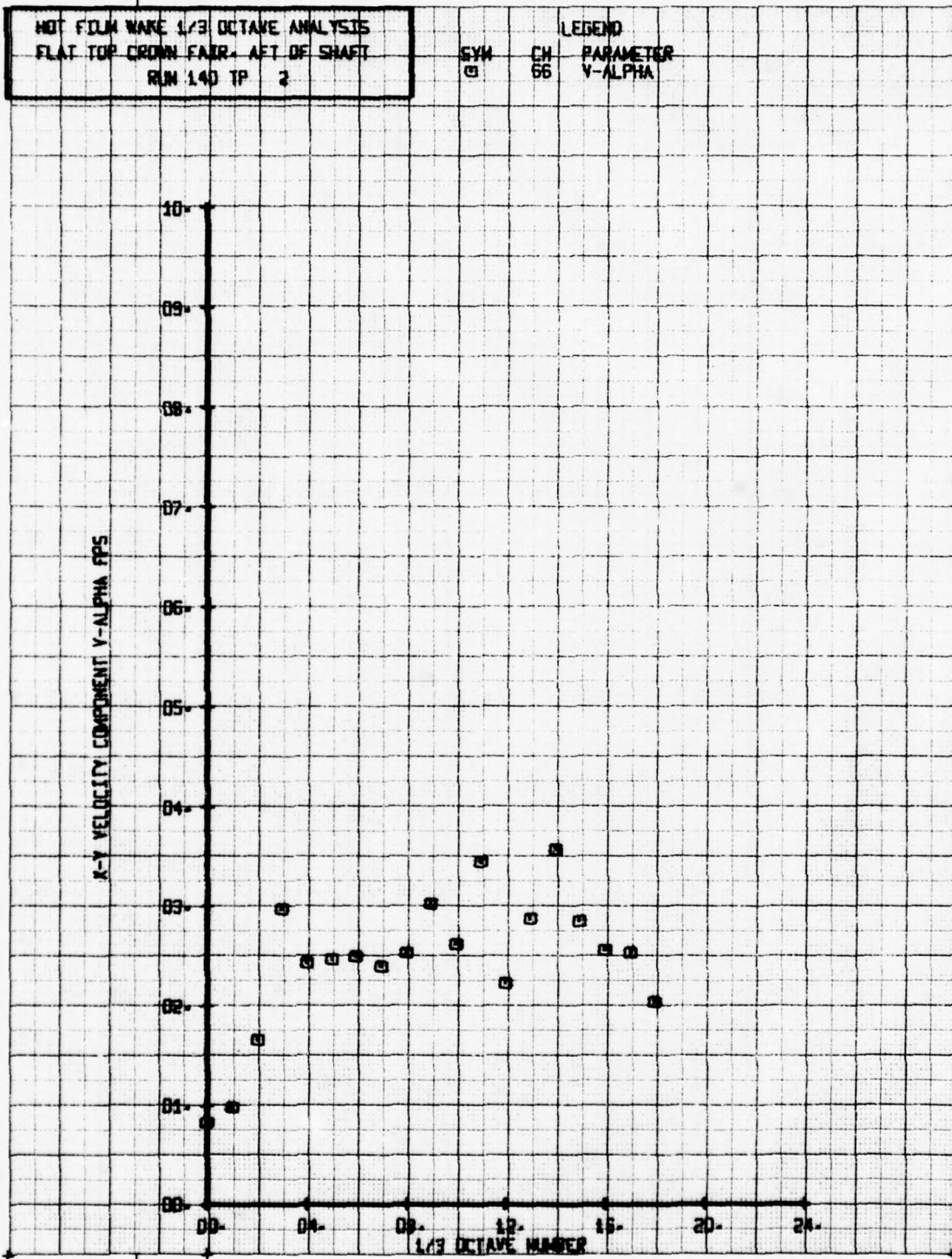
LEGEND
 CH 65
 PARAMETER
 BETA

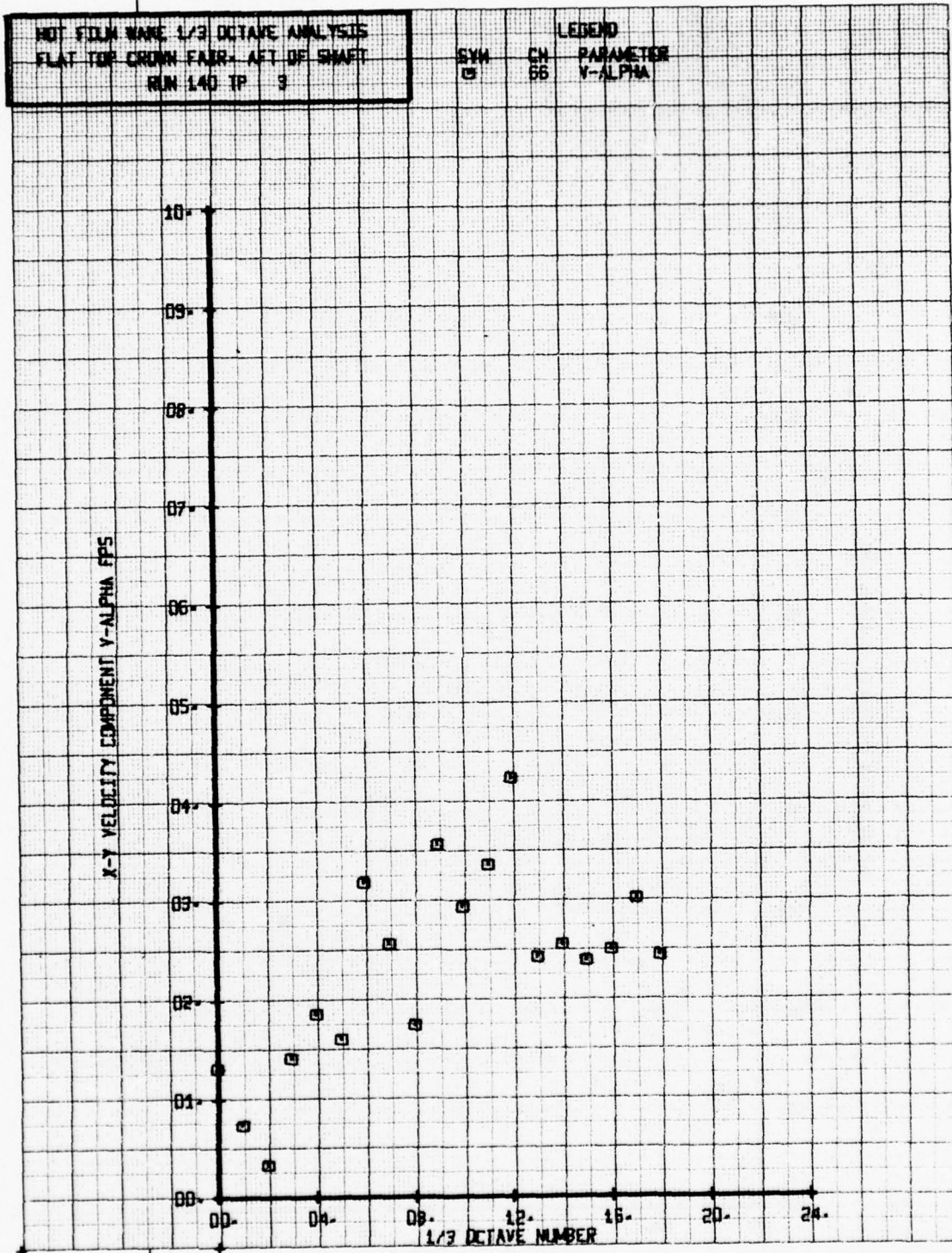
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFT OF SHAFT
 RUN 140 TP 2

SYM	CH	PARAMETER
Q	66	V-ALPHA

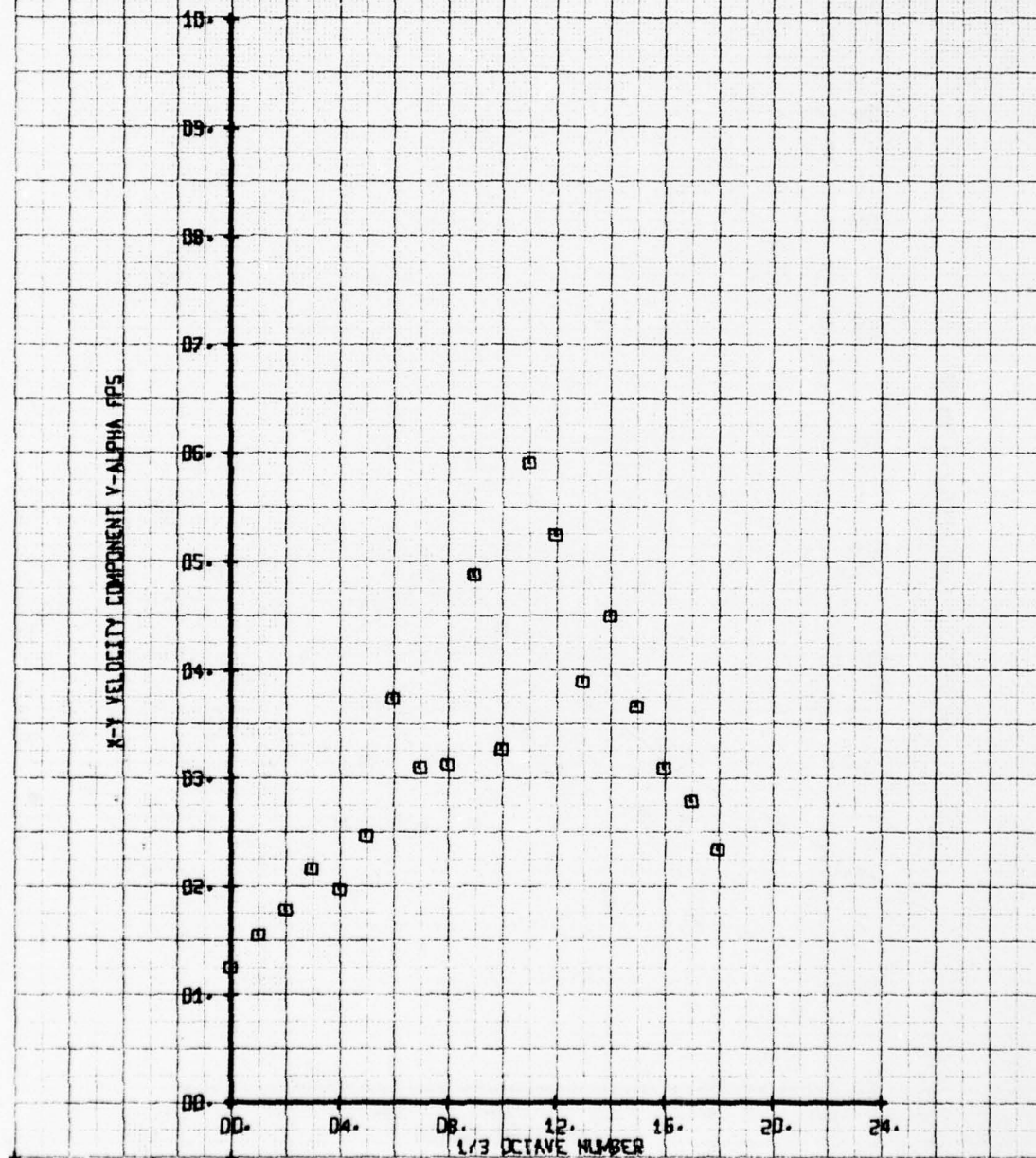




79 01 08 031

HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR - AFT OF SHARP
 RUN 140 TP 4

SYM CH PARAMETER
 □ 66 Y-ALPHA

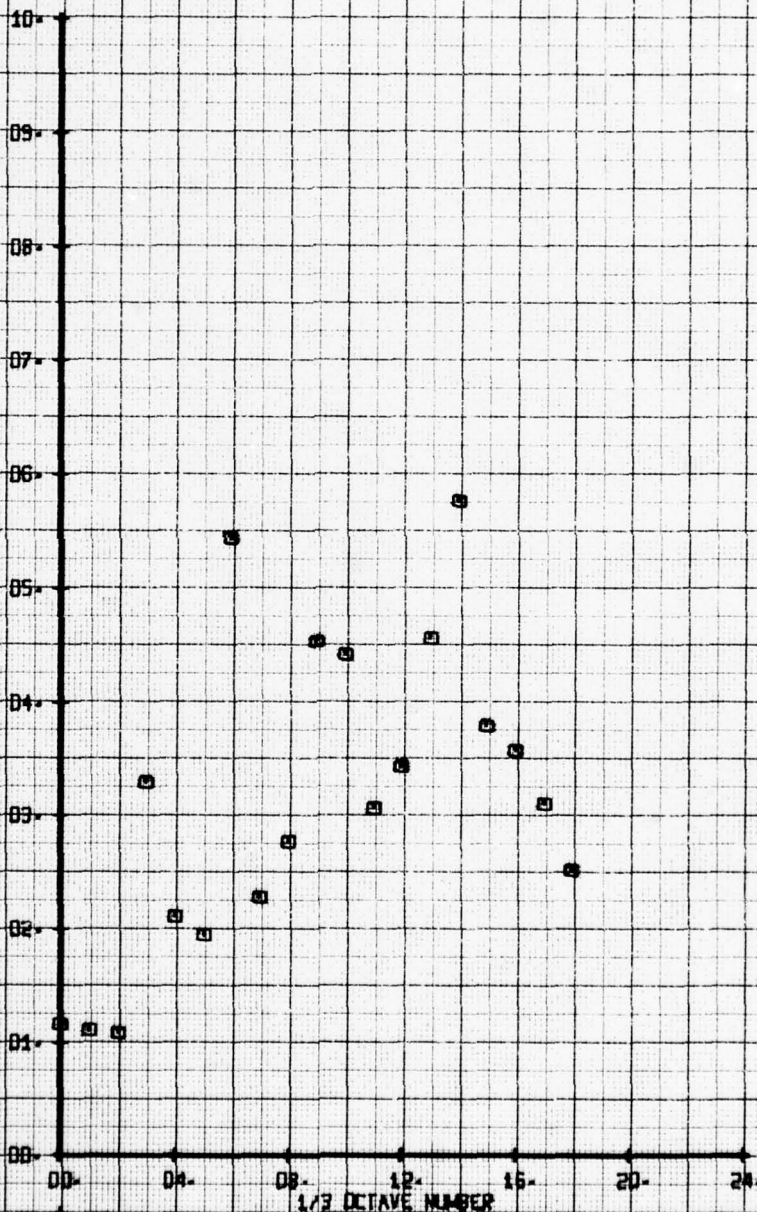


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFT OF SHAFT
 RUN 140 TP 5

SYM
 66

LEGEND
 CH
 66
 PARAMETER
 V-ALPHA

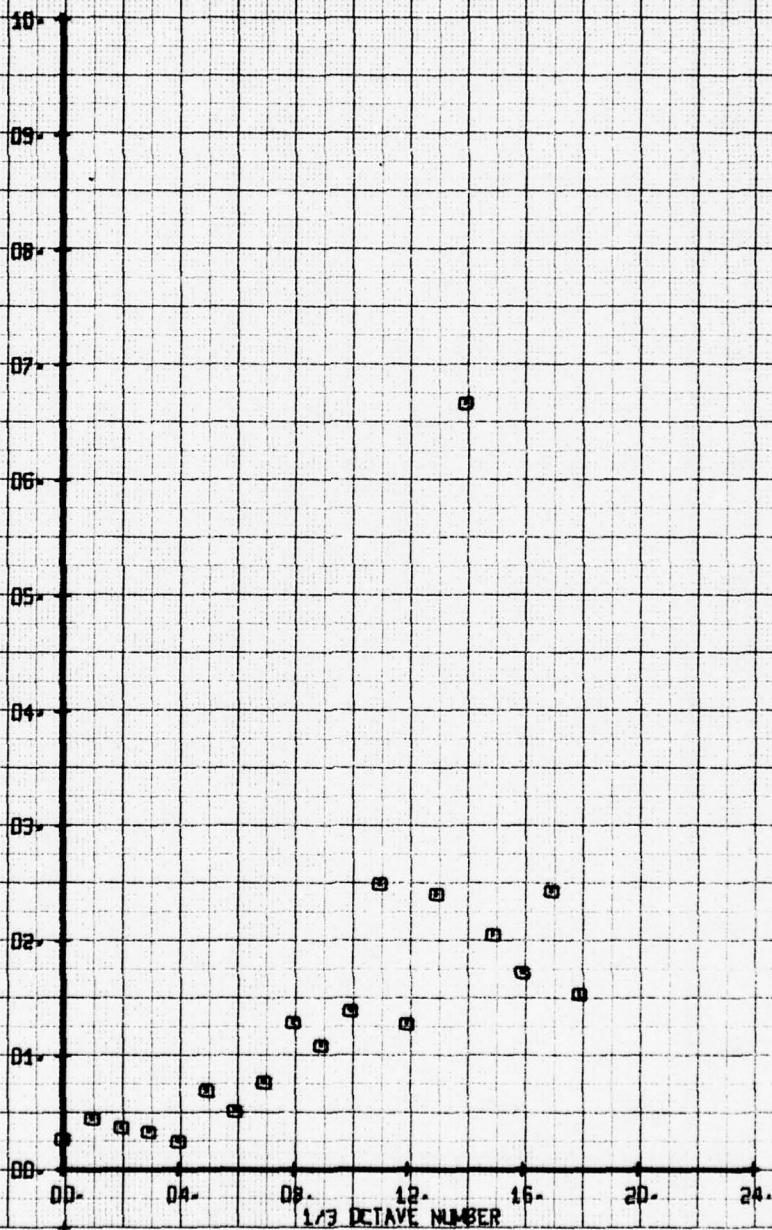
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFT OF SHAFT
 RUN 140 TP 7

SYM	CH	PARAMETER
Q	66	V-ALPHA

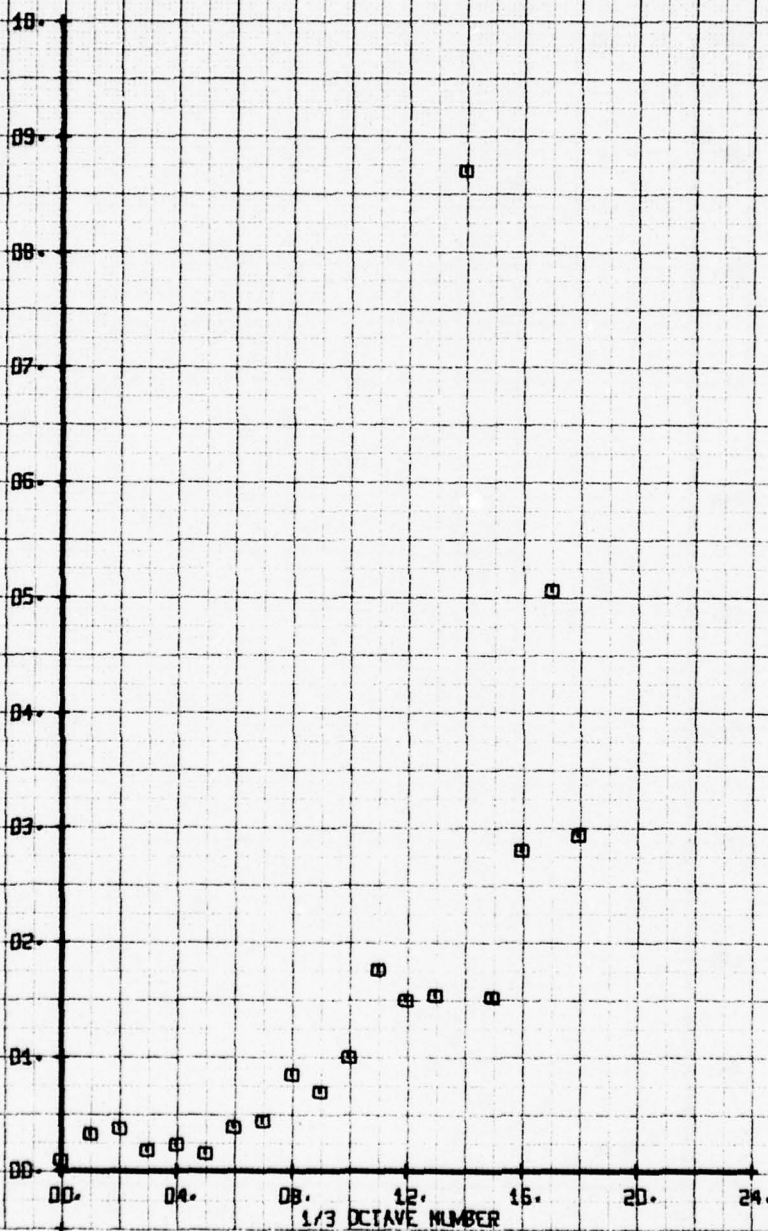
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR, AFT OF SHAFT
 RUN 140 TP 8

SYN CH PARAMETER
 01 56 Y-ALPHA

K-Y VELOCITY COMPONENT Y-ALPHA RPS

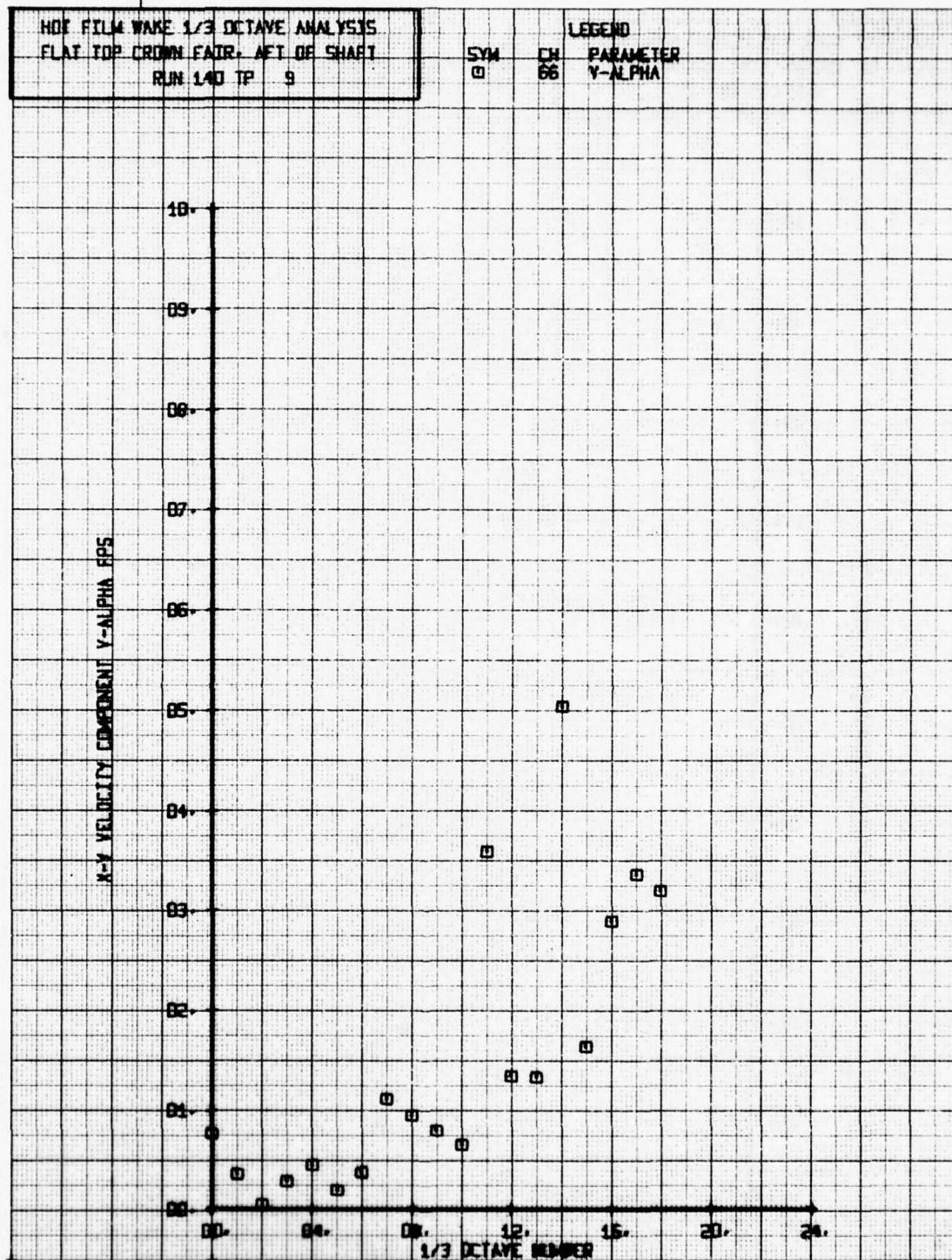


NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR. AFT OF SHIRT
 RUN 140 TP 9

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA



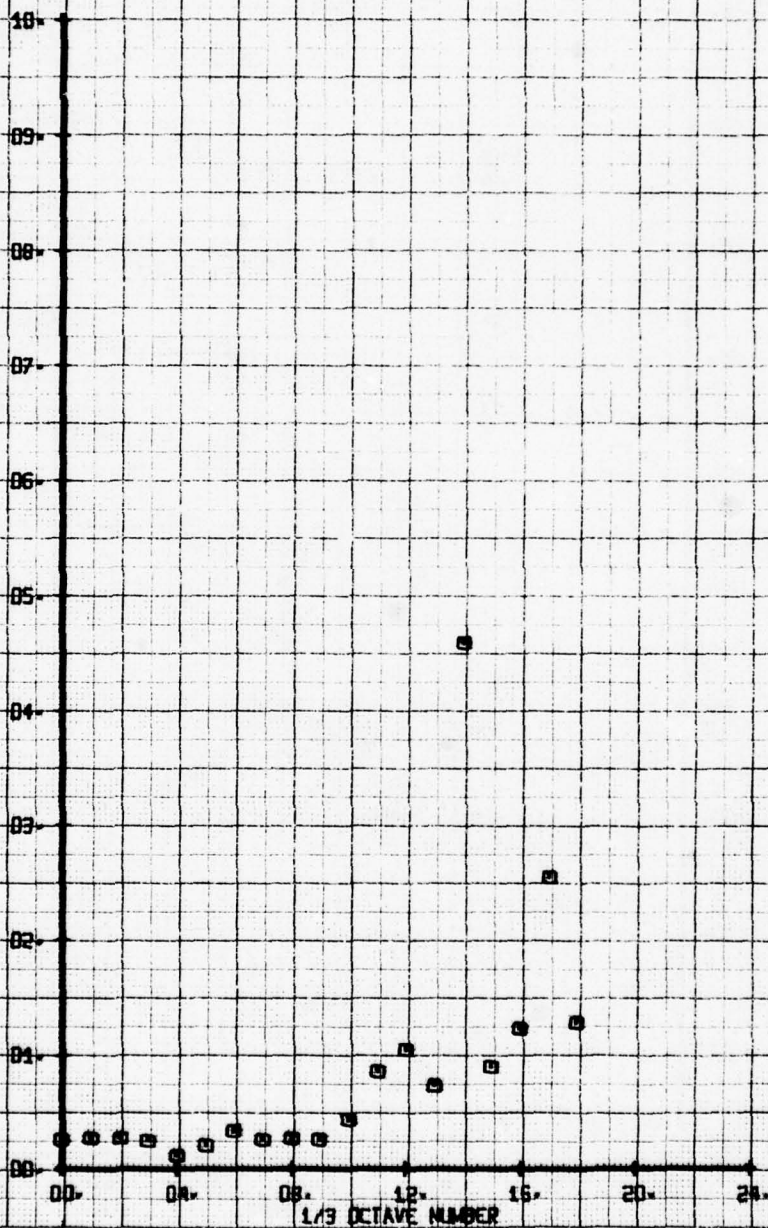
HOT FILM WARE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR. AFT OF SHAFT
 RUN 140 TP 10

SYM
 0

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

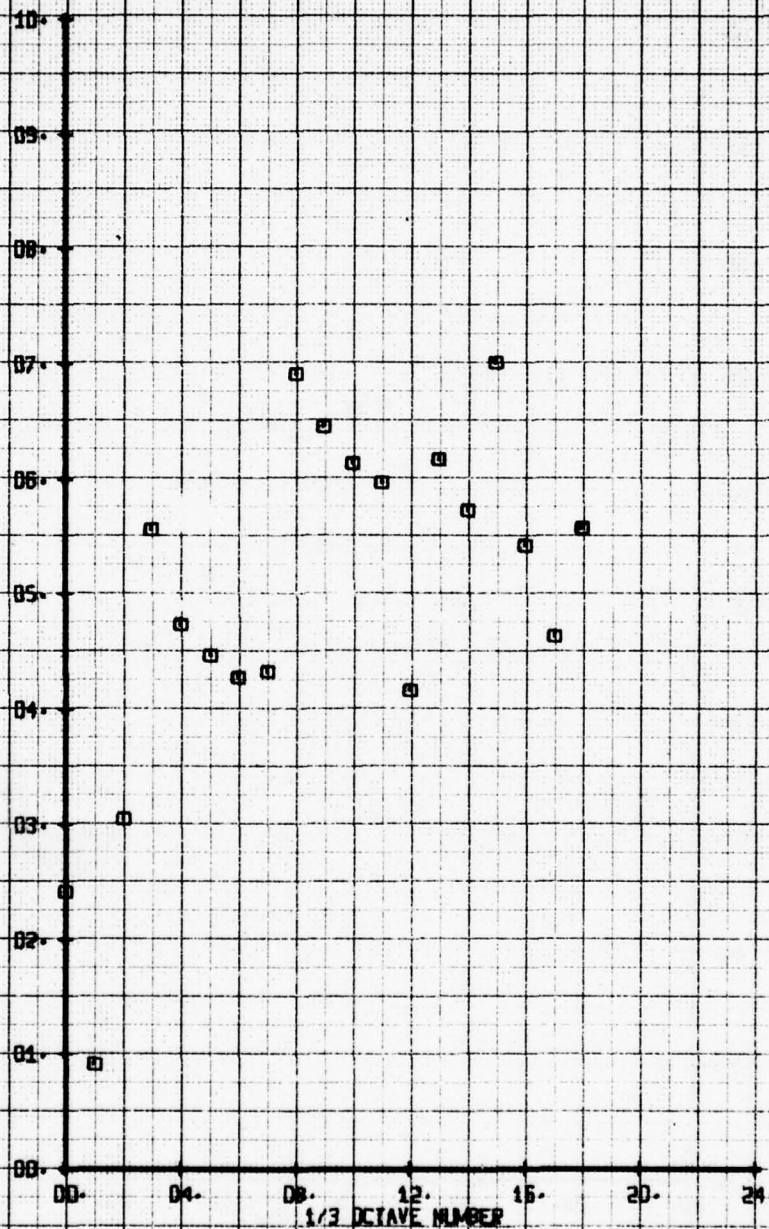
X-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WARE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR AFT OF SHARP
 RUN 140 TP 2

SYM CN PARAMETER
 @ 55 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS

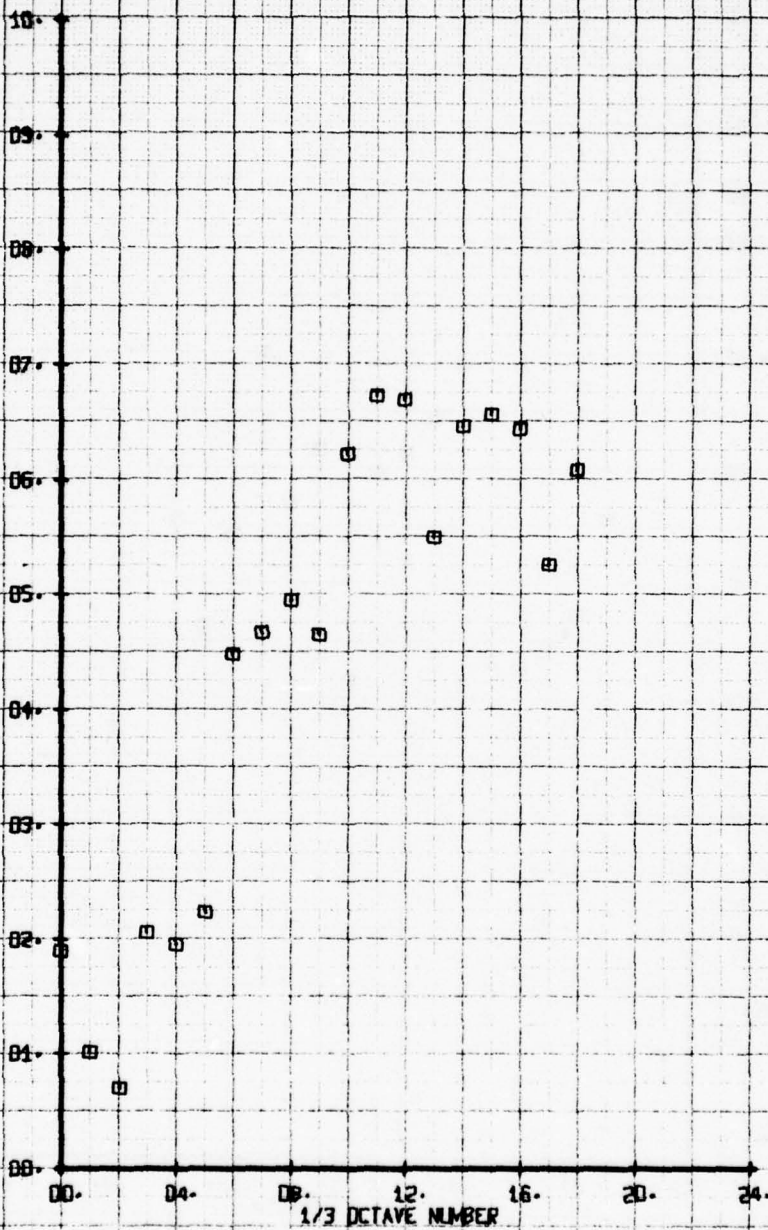


HOE FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR AFT OF SHARP
 RUN 140 TP 3

SYM
 □

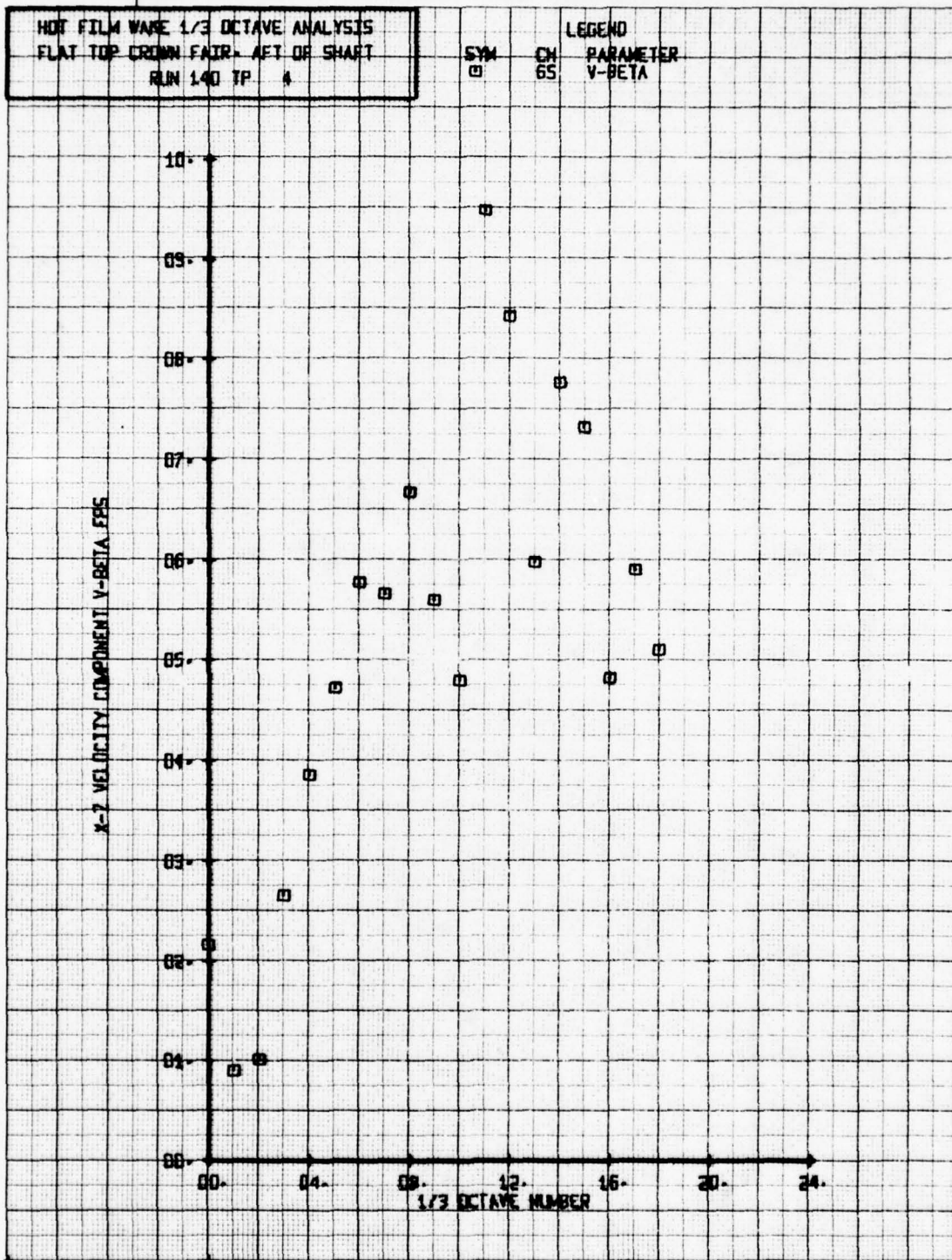
LEGEND
 CH 65
 PARAMETER
 V-BETA

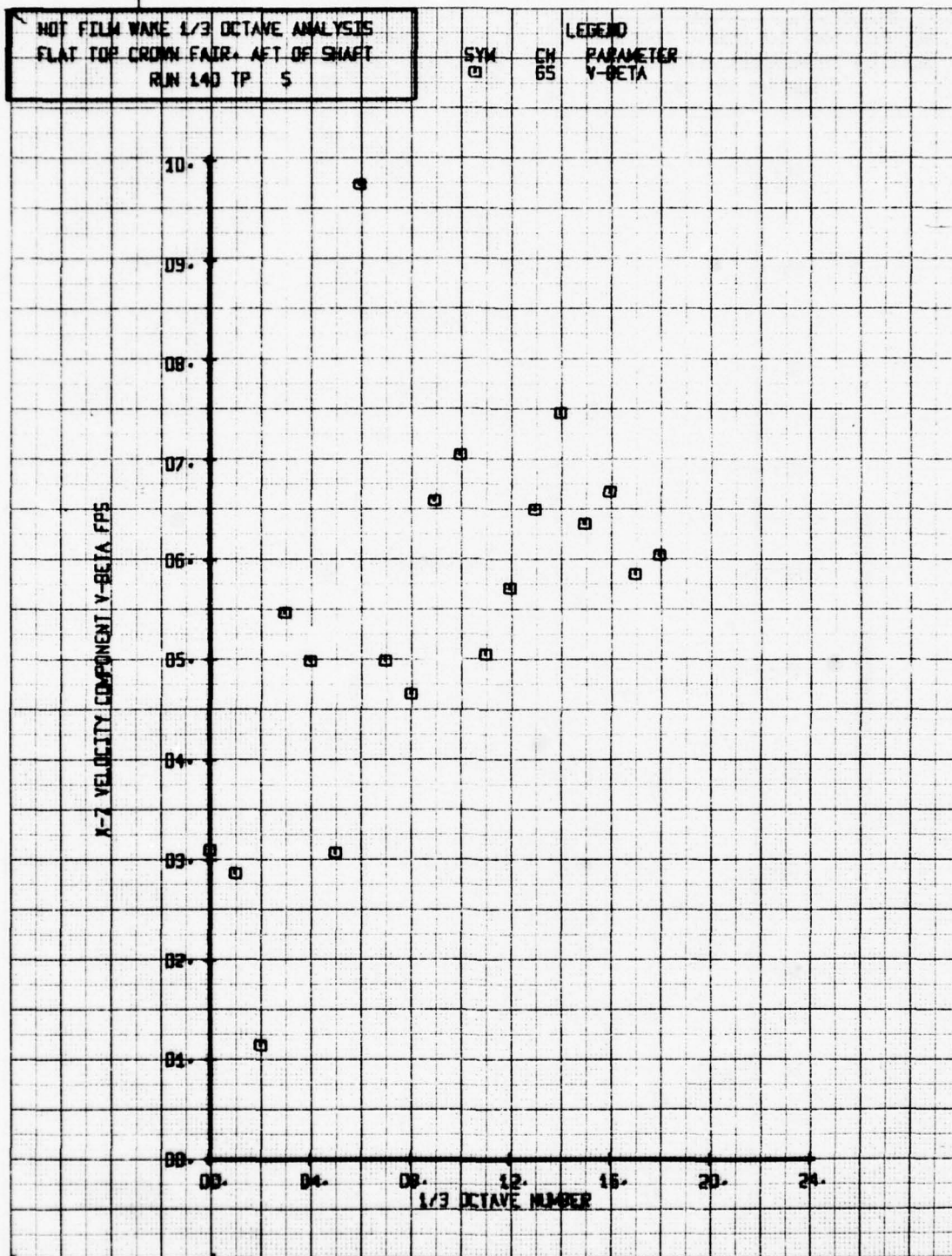
X-2 VELOCITY COMPONENT V-BETA FPS

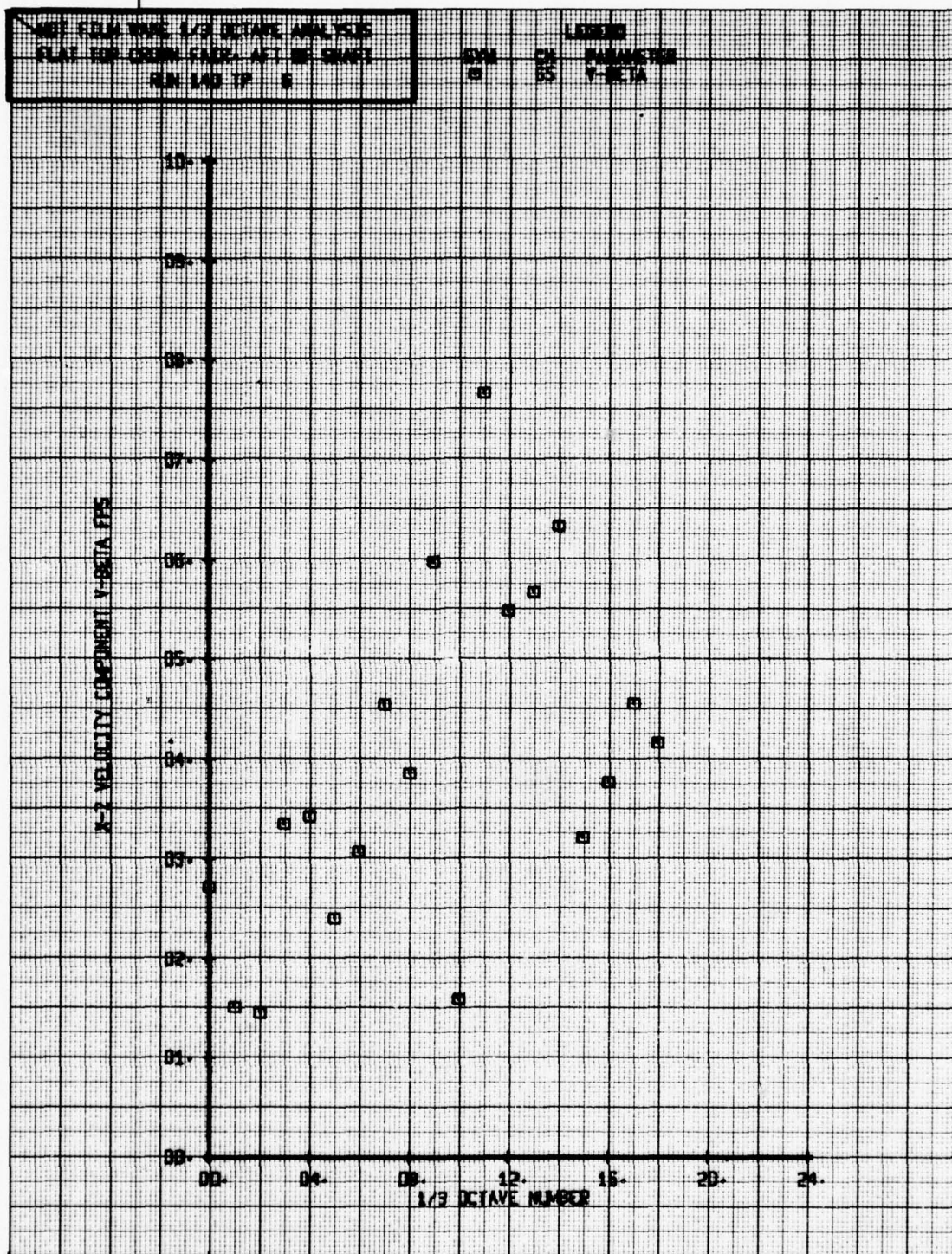


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR - AET OF SHIRT
 RUN 140 TP 4

SYM CH
 65
 LEGEND
 PARAMETER
 V-BETA







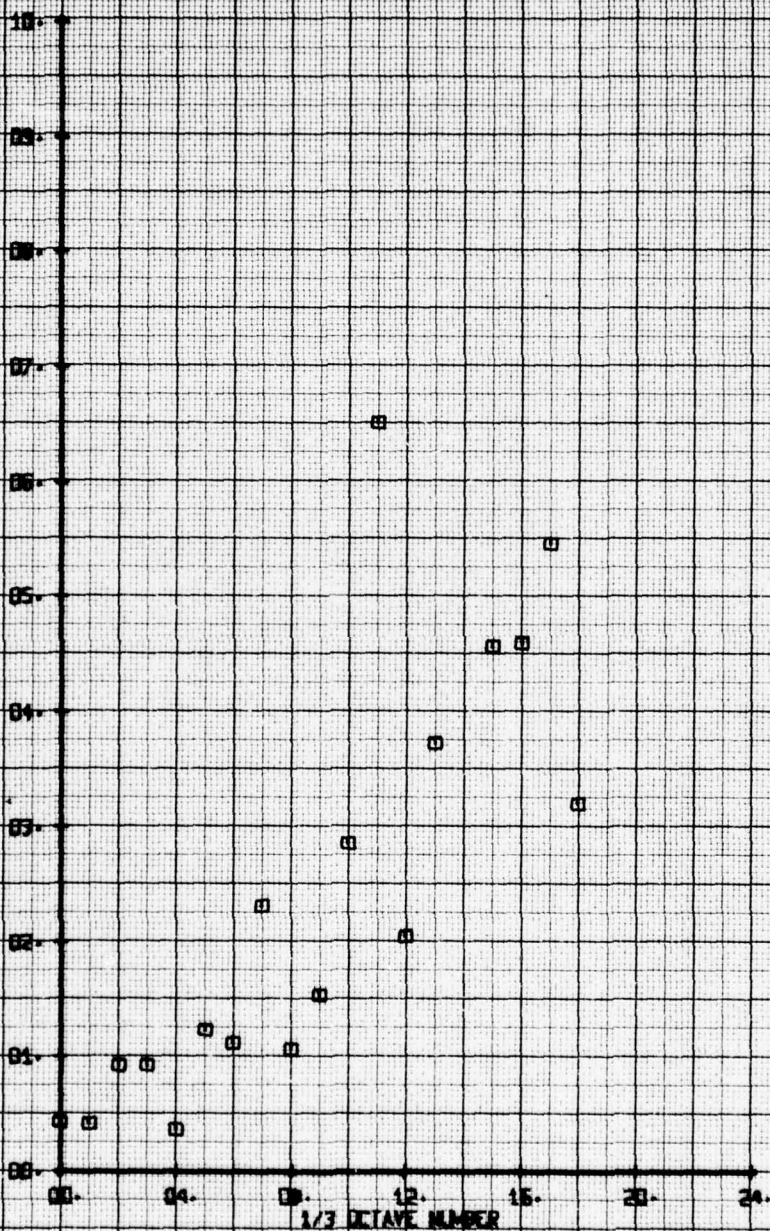
NOI FILM WAVE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFI OF SHARP
 RUN 140 IF 7

SYM
 □

DN
 65

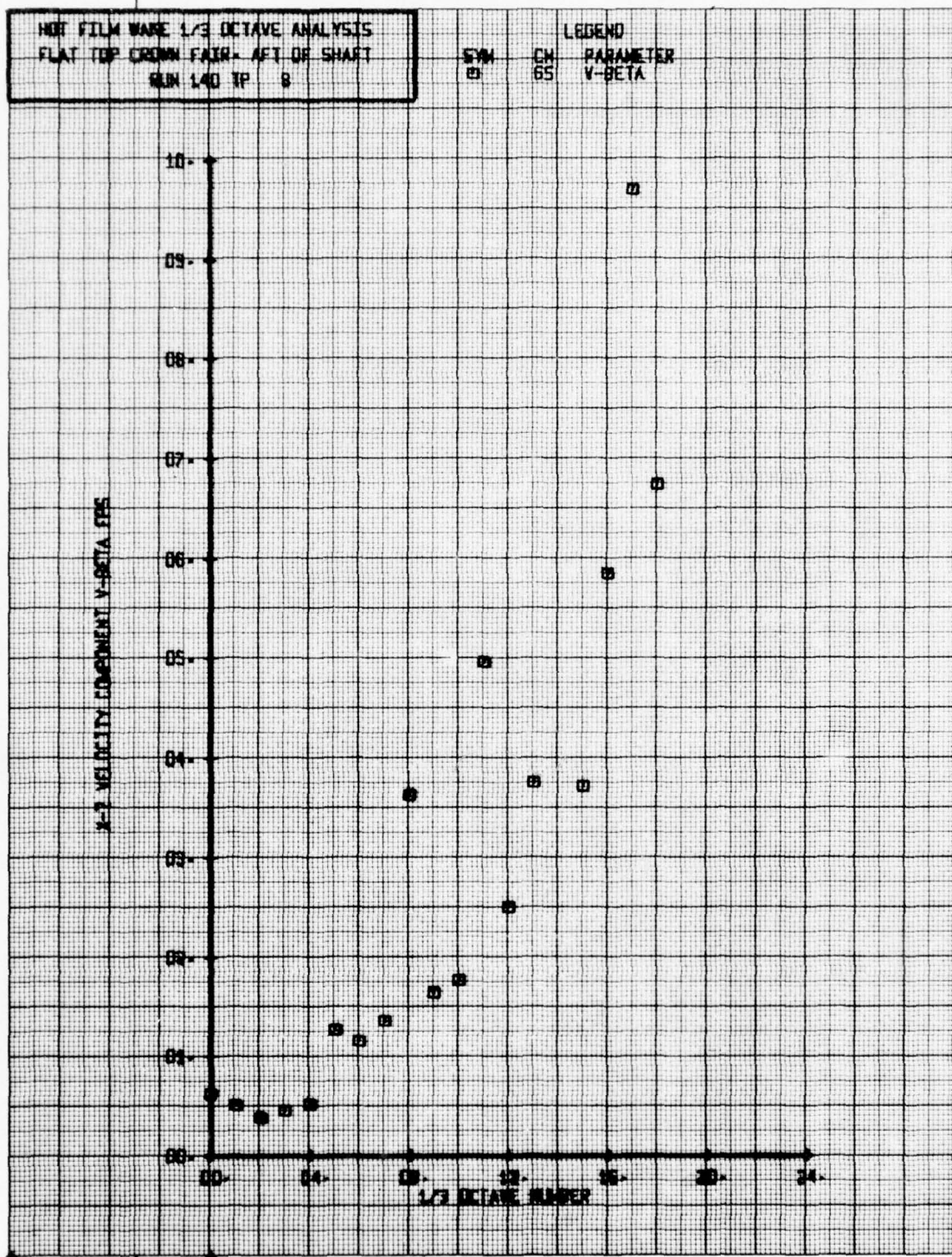
LEGEND
 PARAMETER
 Y-BETA

K-2 VELOCITY COMPONENT Y-BETA FTS



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- AFT OF SHART
 RUN 140 TP 8

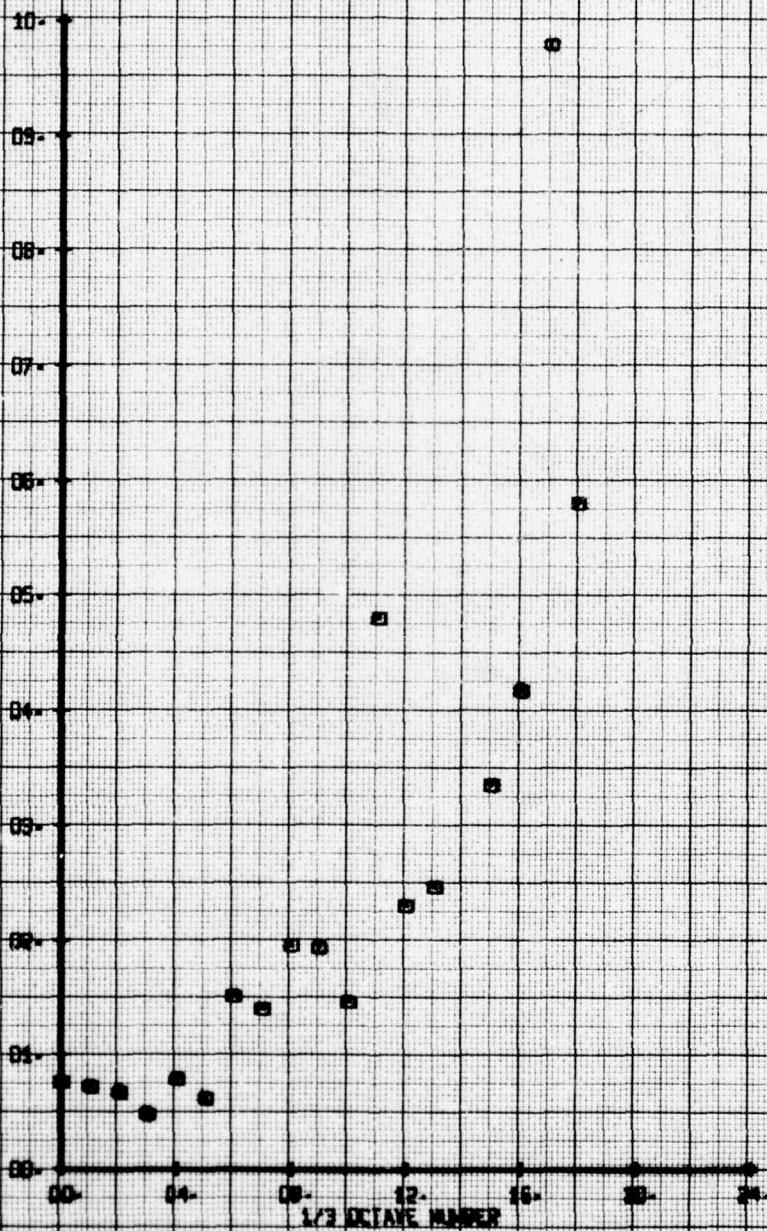
LEGEND
 CH 65
 PARAMETER
 V-BETA

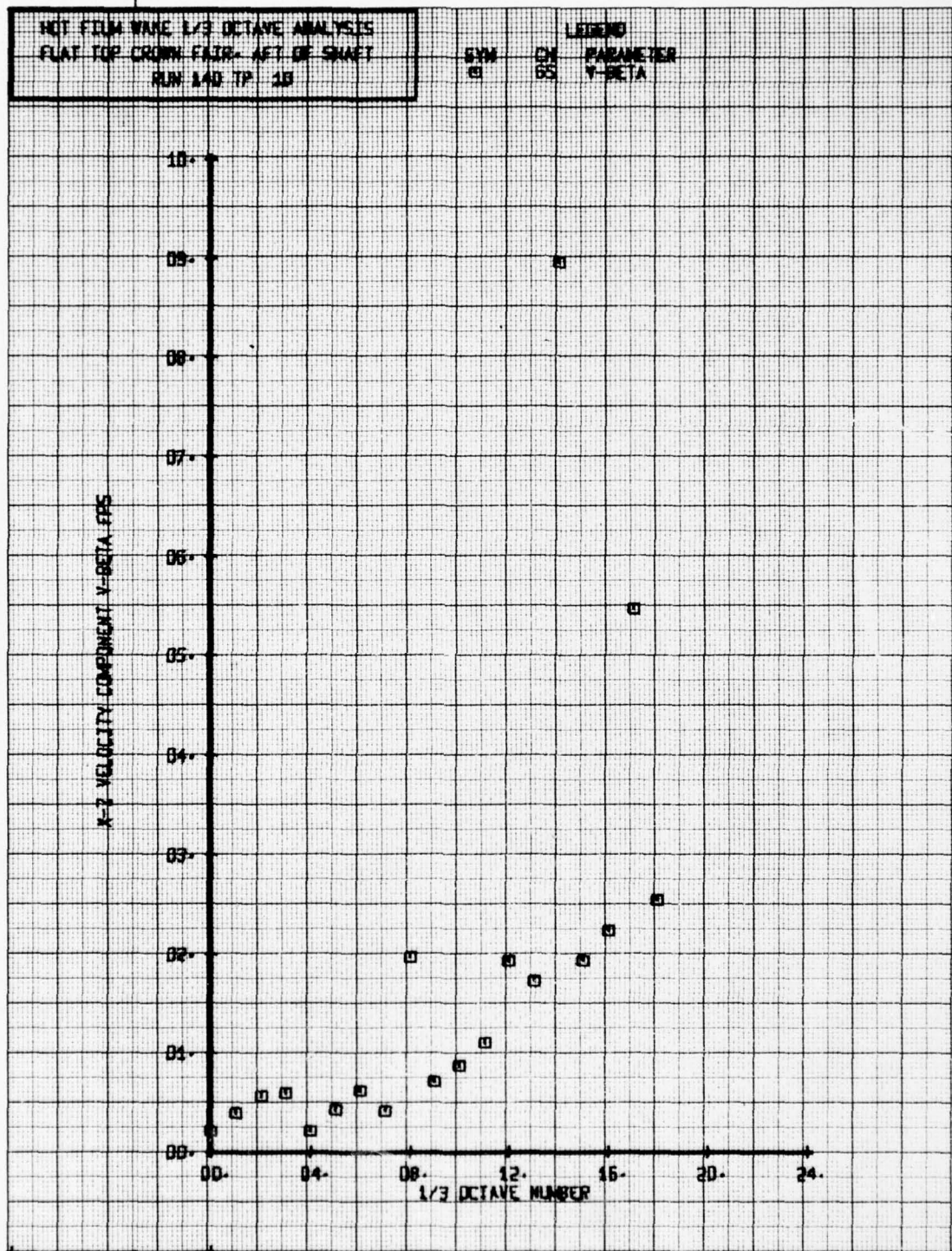


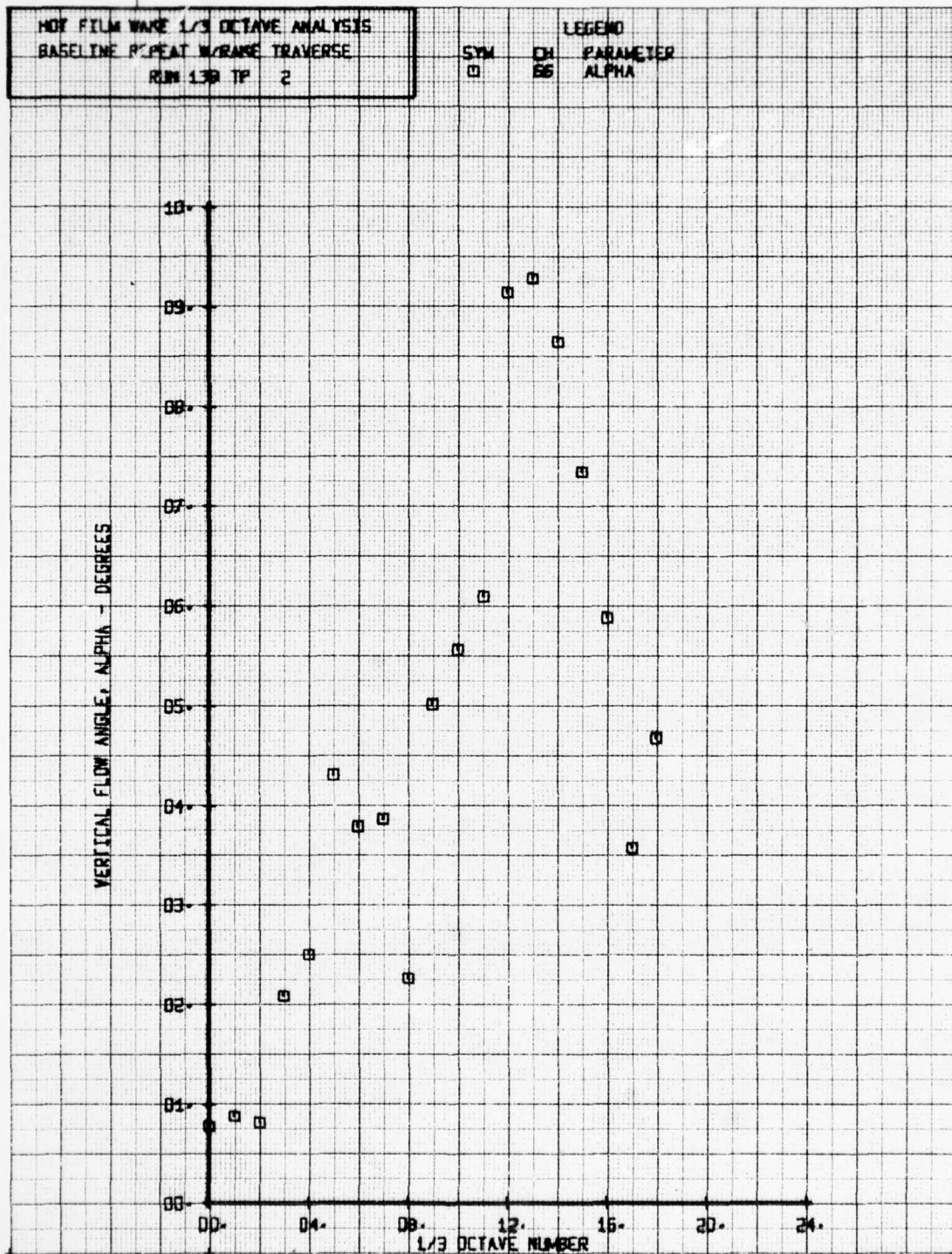
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 FLAT TOP CROWN FAIR- 4FT OF SHAFT
 RUN 140 TP 9

SYN CH PARAMETER
 65 65 V-BETA

K-2 VELOCITY COMPONENT V-BETA FPS

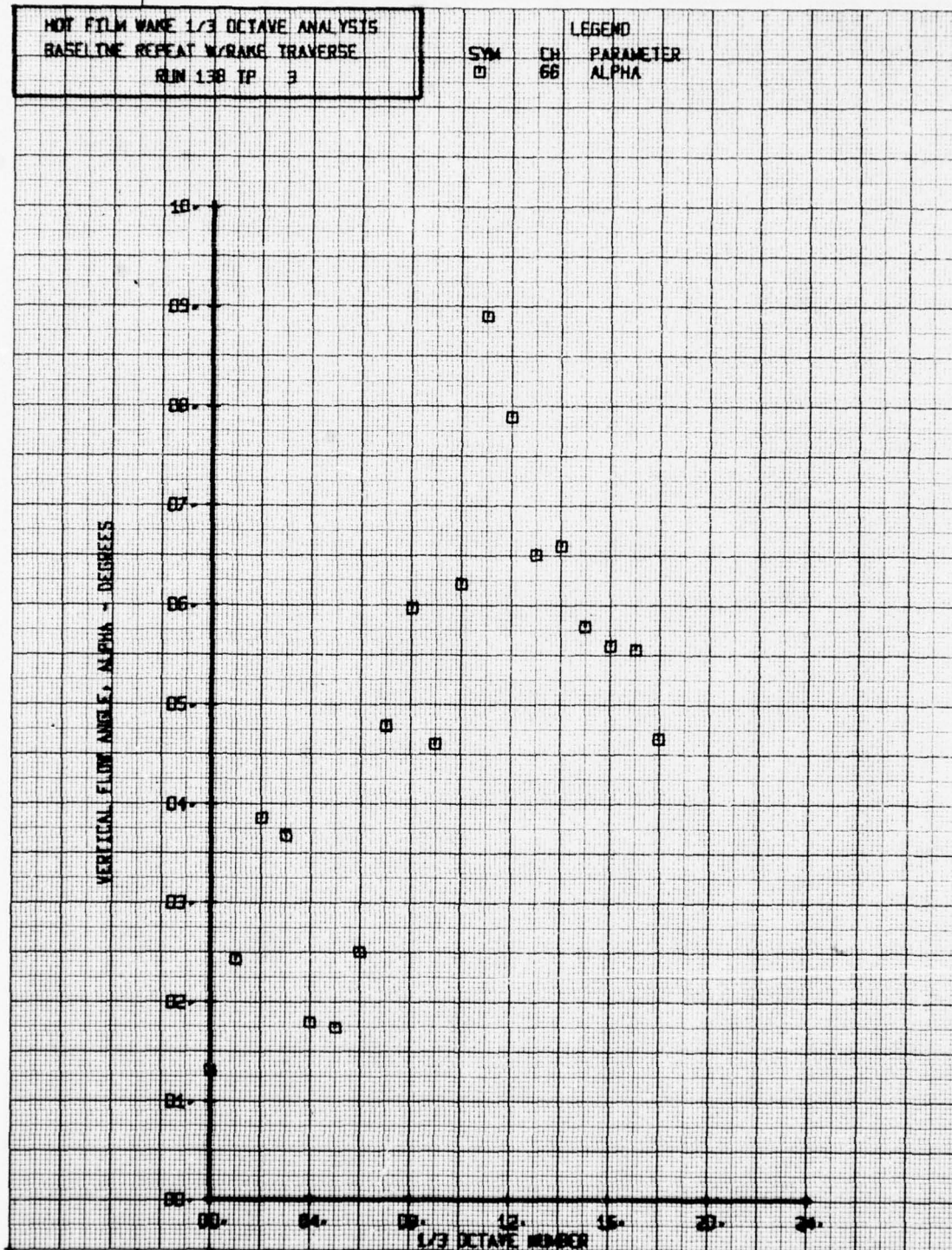






HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RANGE TRAVERSE
 RUN 138 TP 3

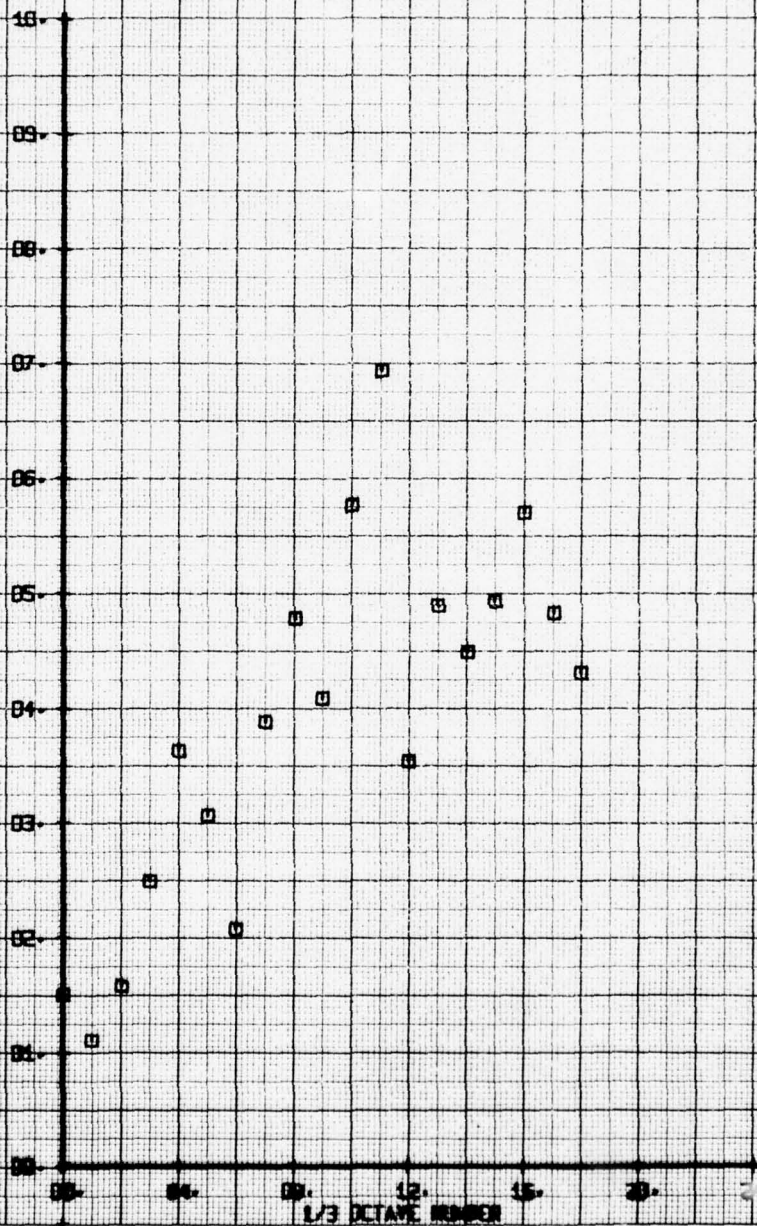
LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA

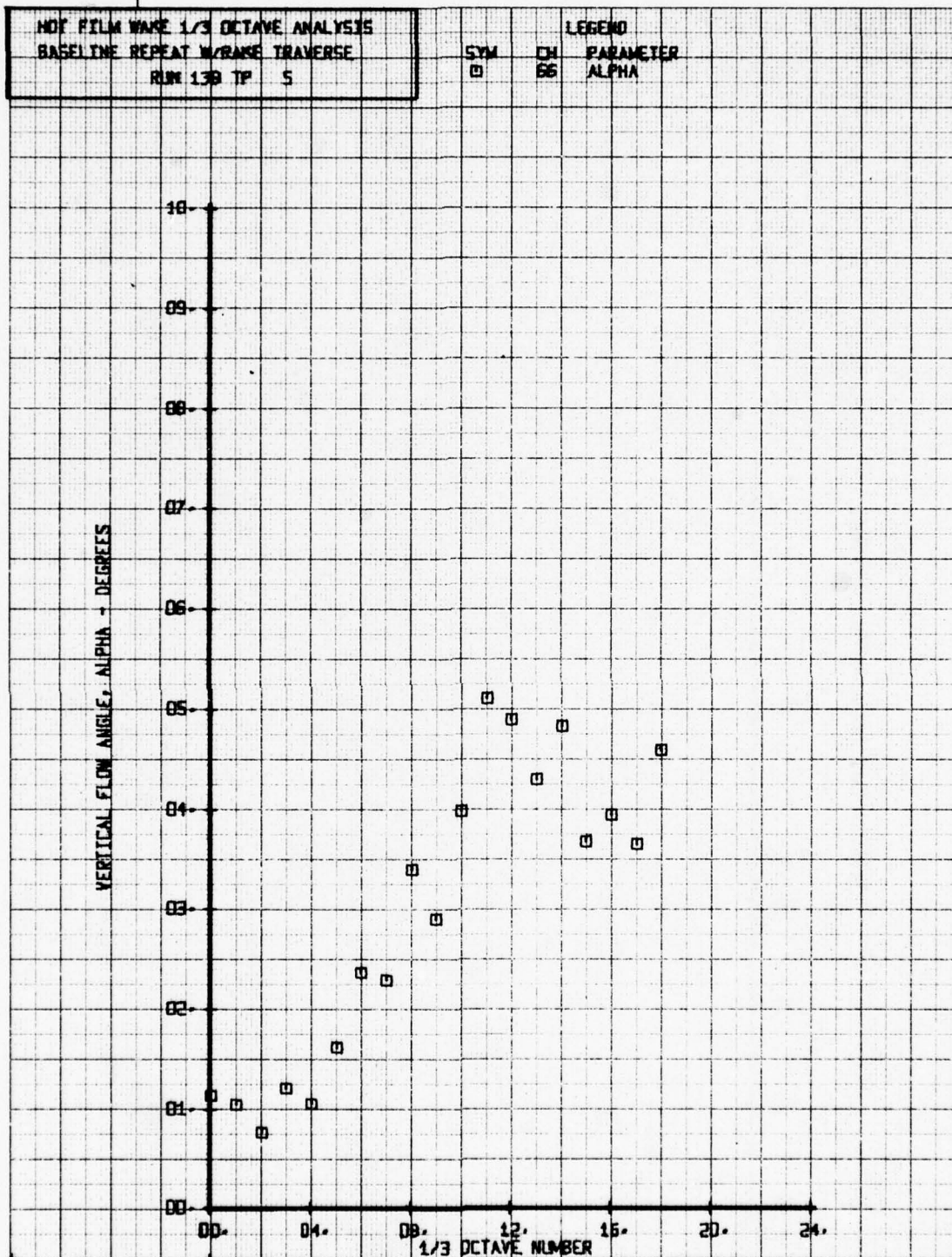


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAME TRAVERSE
 RUN 138 TP 4

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

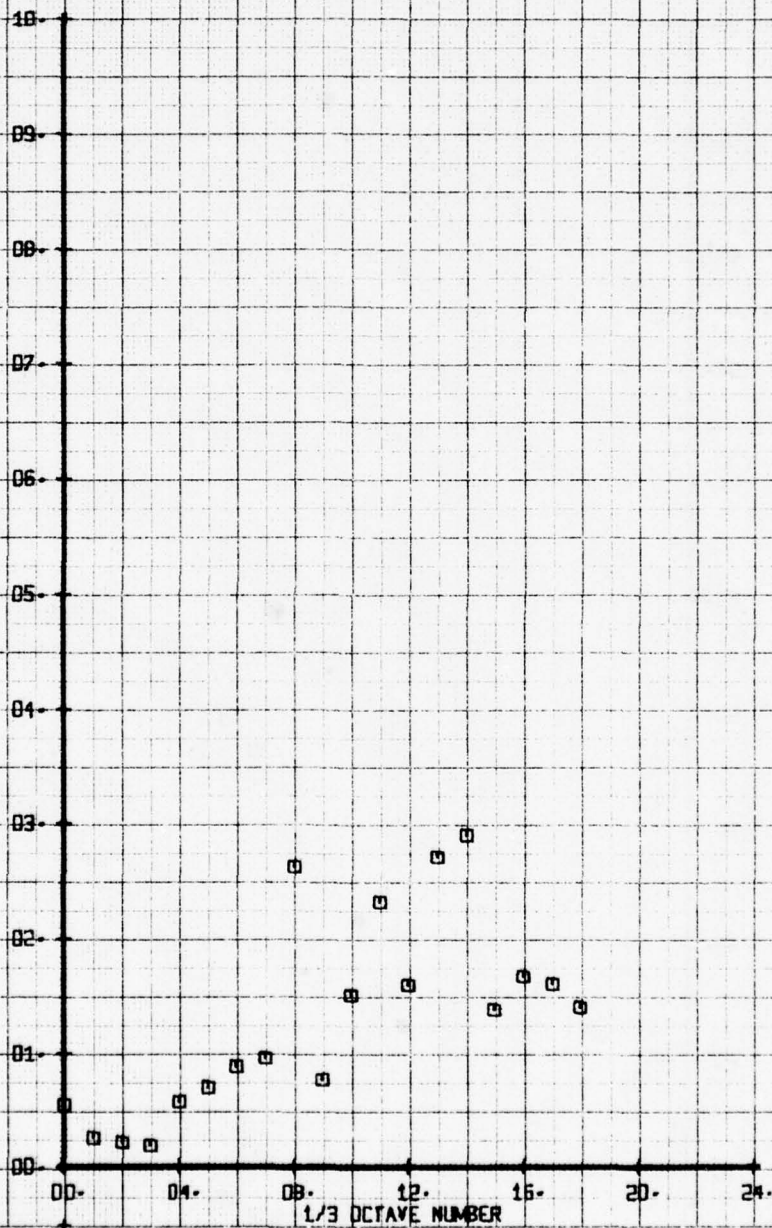




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 13B TP 6

SYM CH PARAMETER
 □ 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



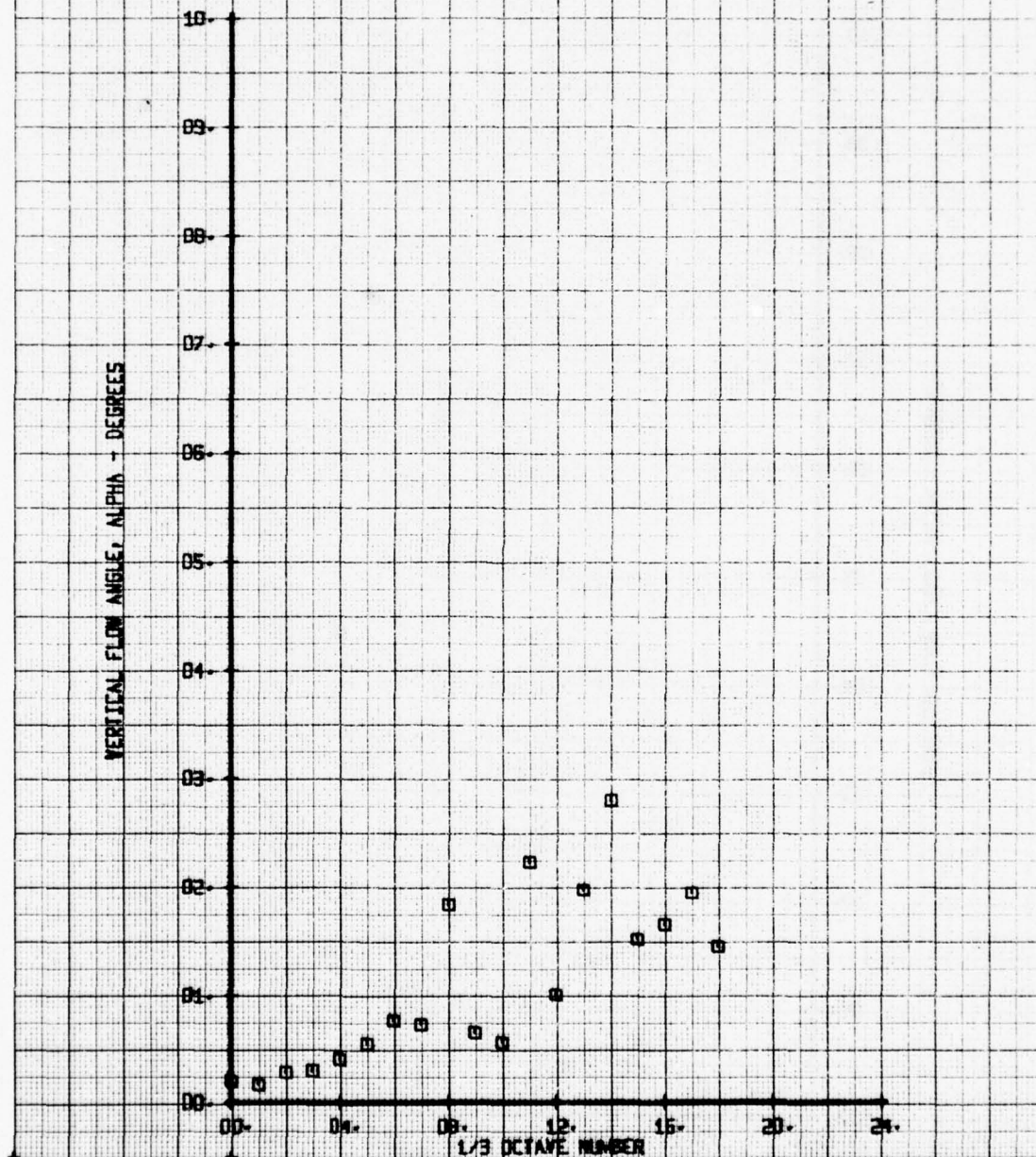
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 7

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

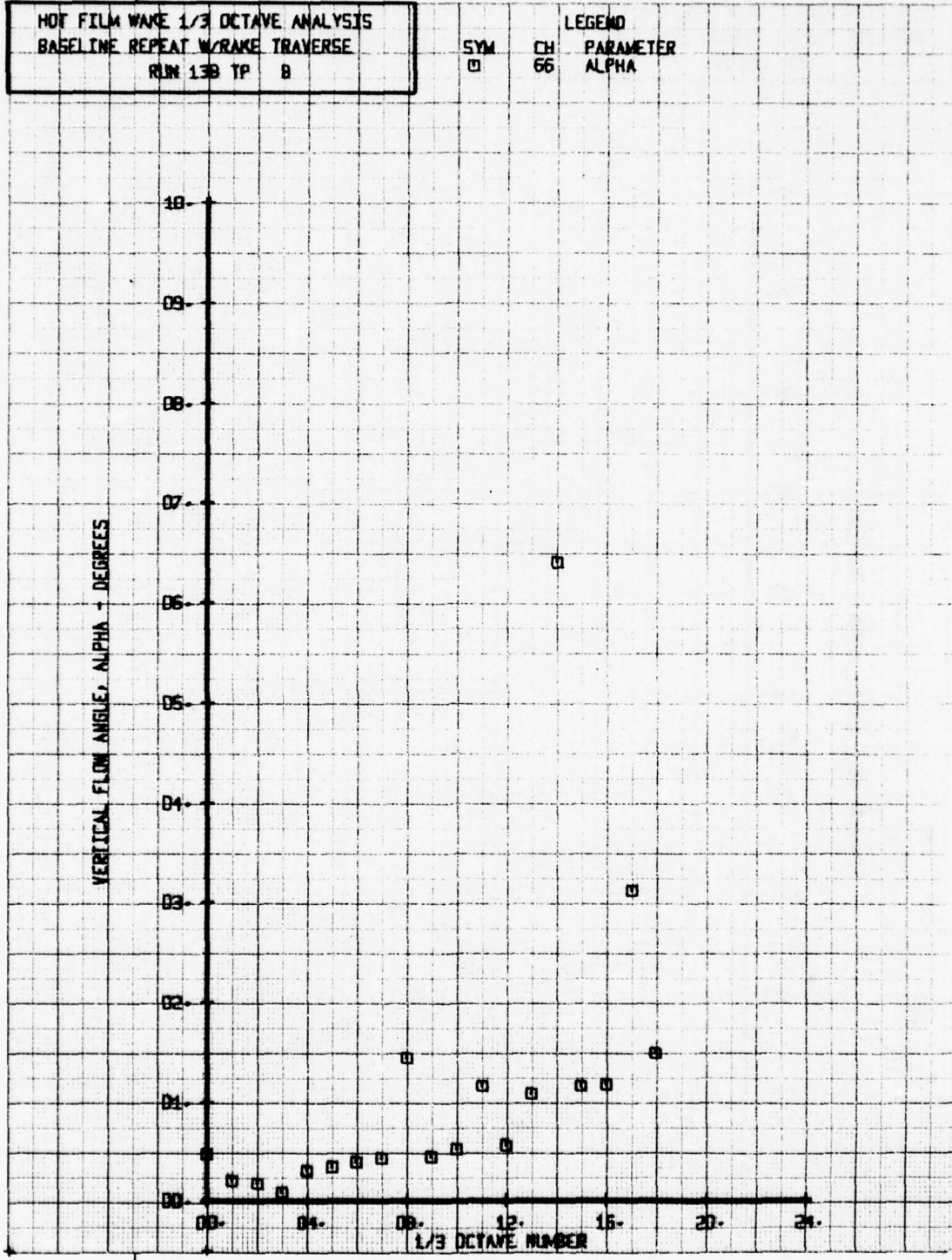
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 139 TP 8

SYM CH PARAMETER
 □ 66 ALPHA

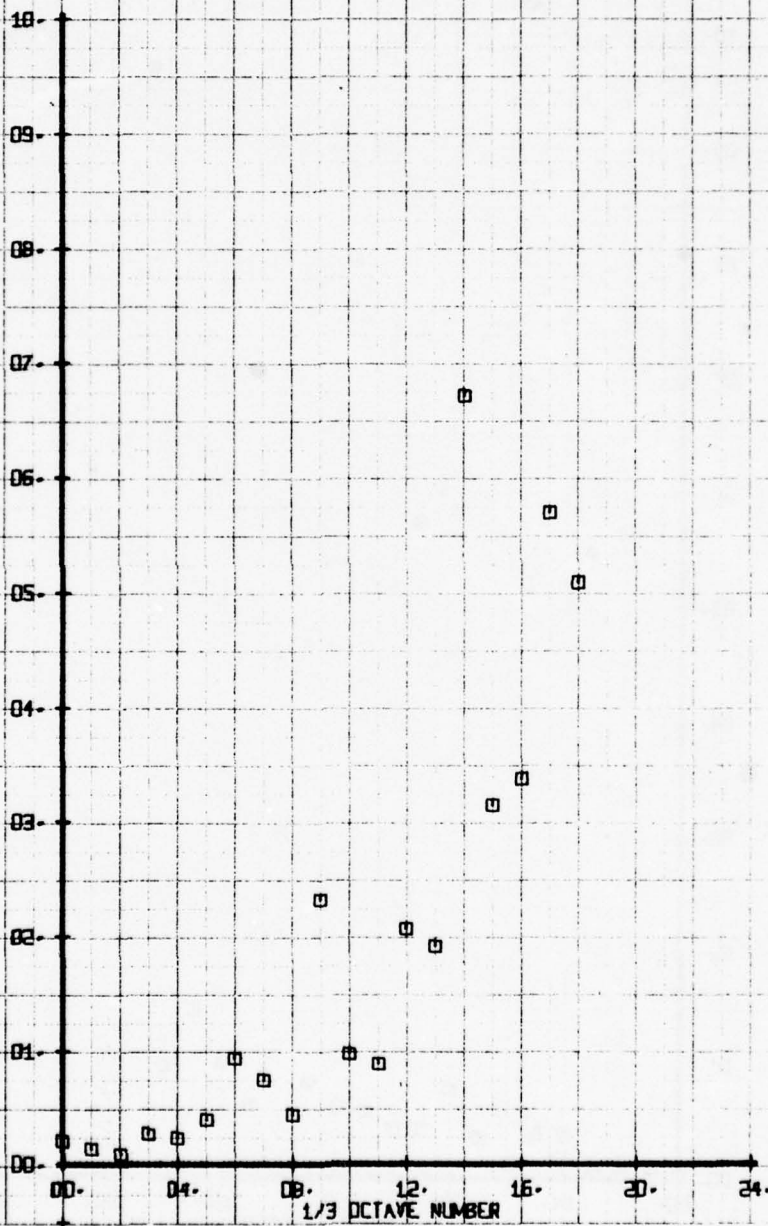
VERTICAL FLOW ANGLE, ALPHA - DEGREES



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 139 TP 9

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



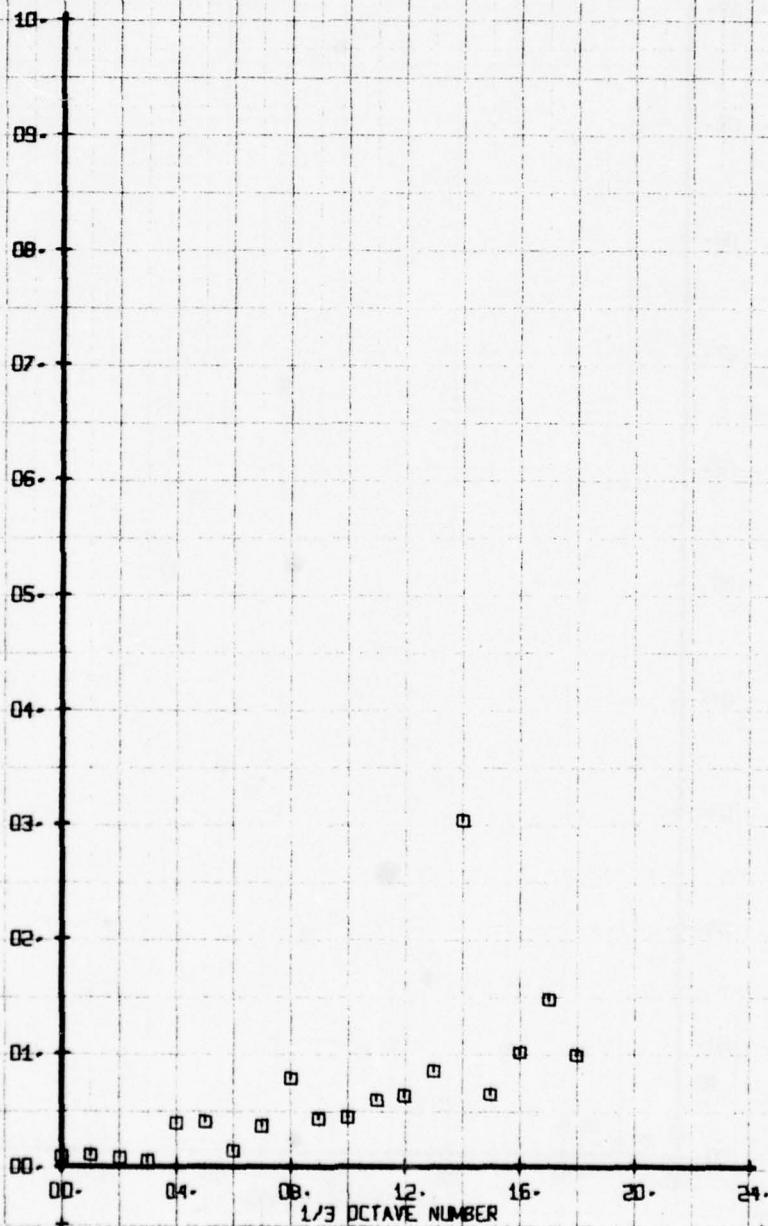
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 130 TP 10

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



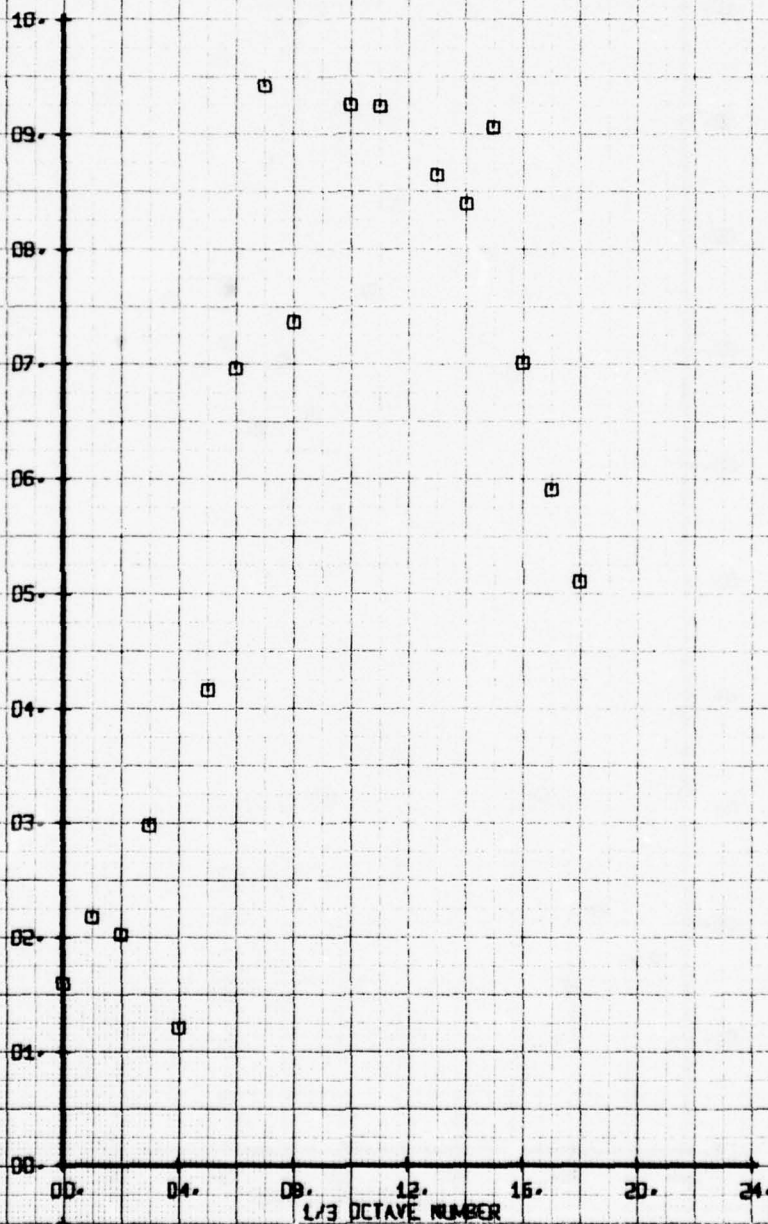
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 13B TP 2

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

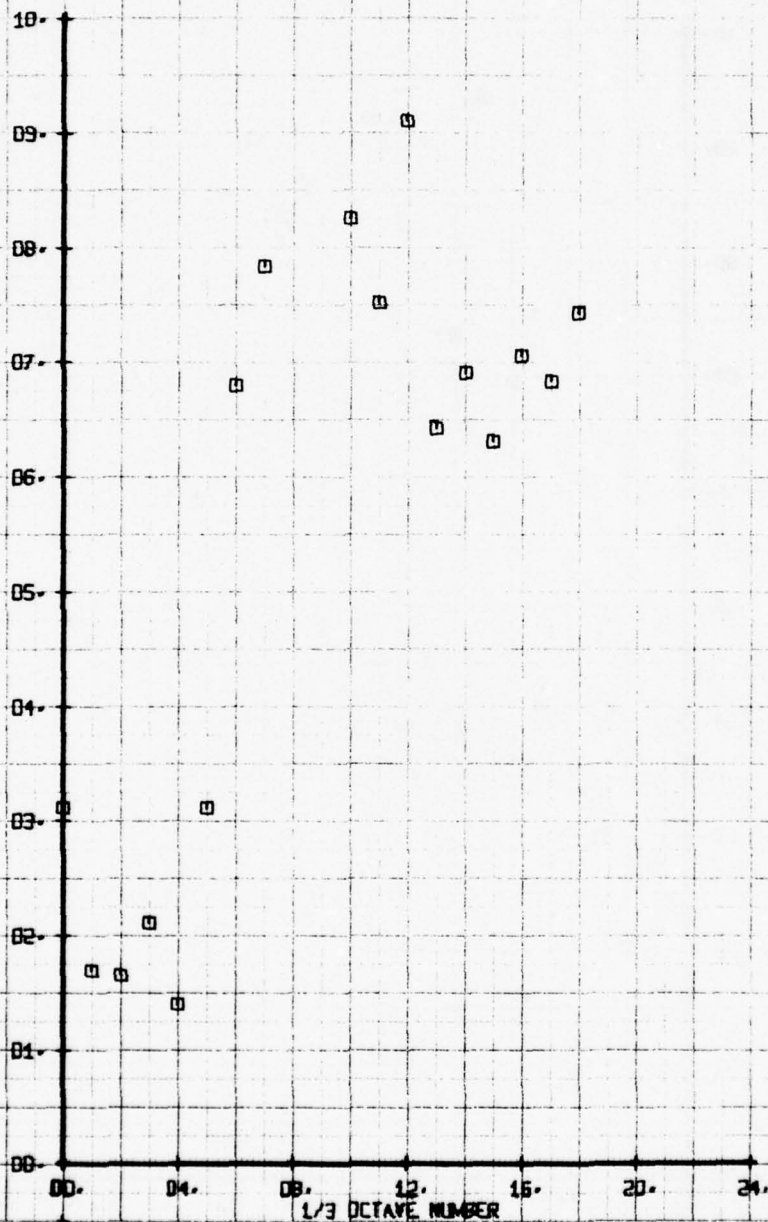
LATERAL FLOW ANGLE, BETA - DEGREES

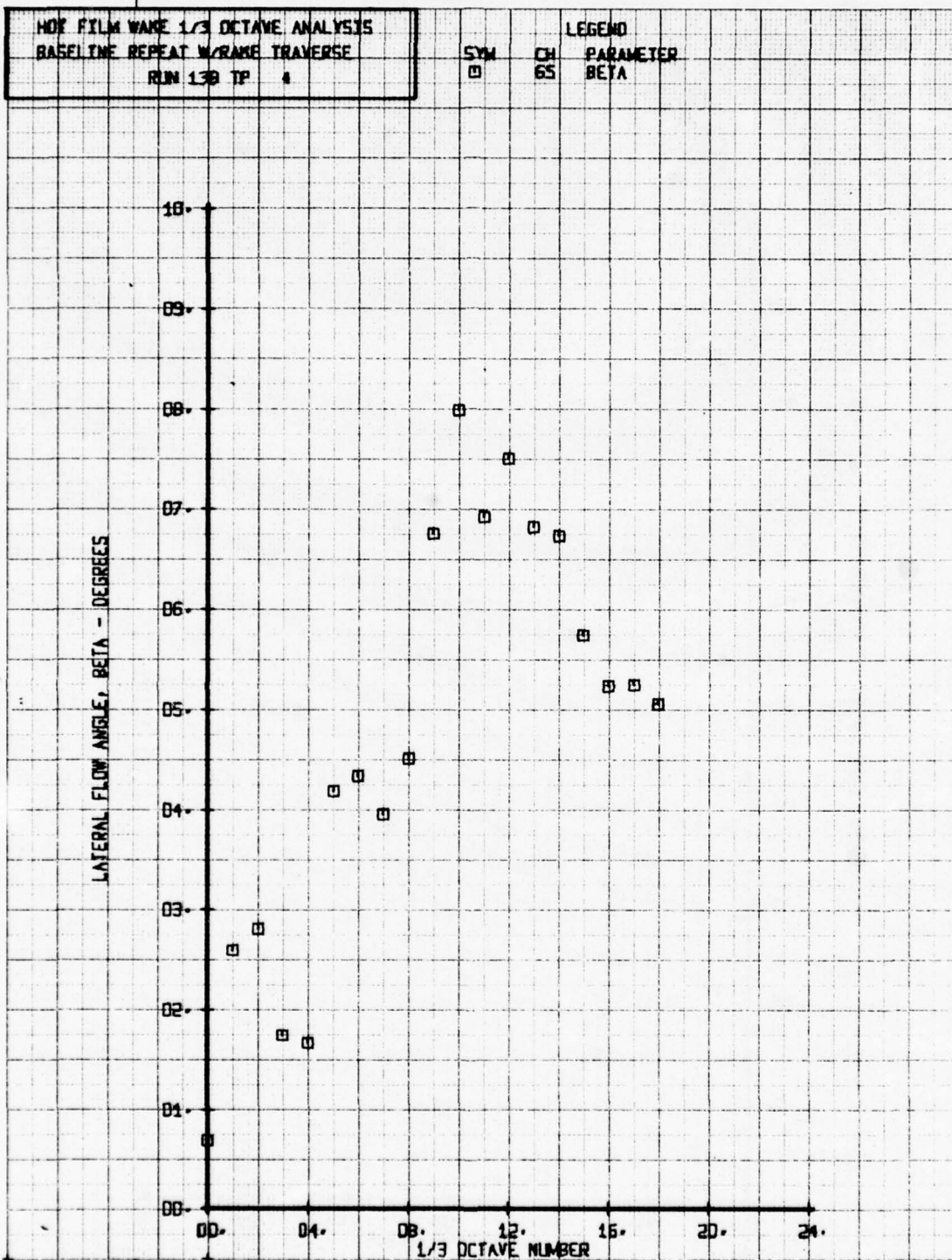


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 130 TP 3

LEGEND
 SYM CH PARAMETER
 □ 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

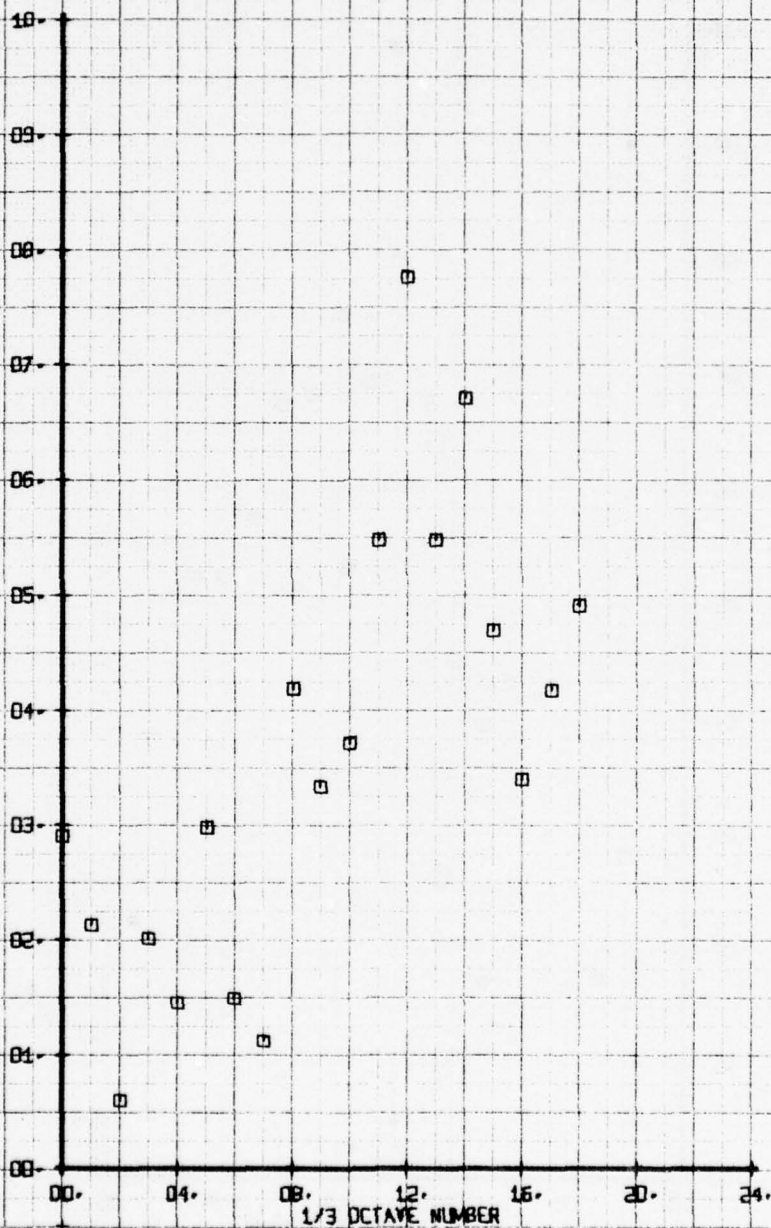




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAMP TRAVERSE
 RUN 138 TP 5

LEGEND
 SYM CH PARAMETER
 □ 65 BETA

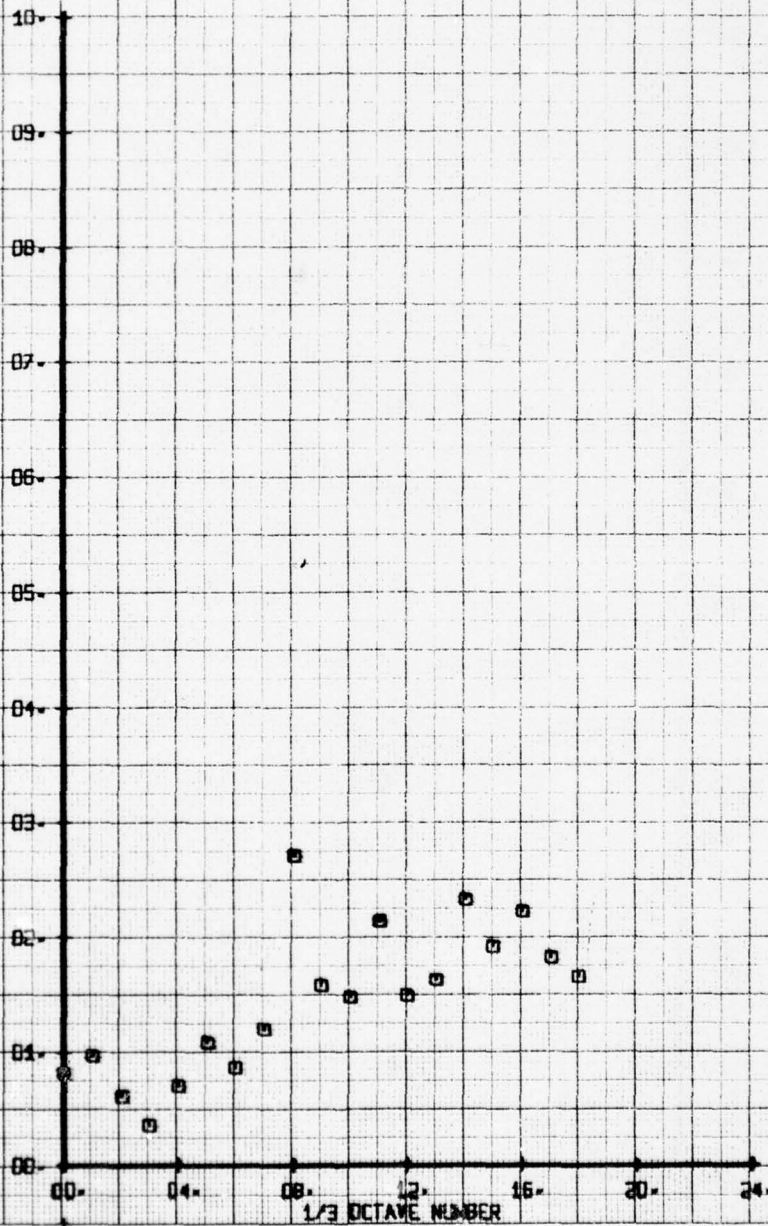
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 6

LEGEND	
SYM	CH
□	65
	PARAMETER
	BETA

LATERAL FLOW ANGLE, BETA - DEGREES

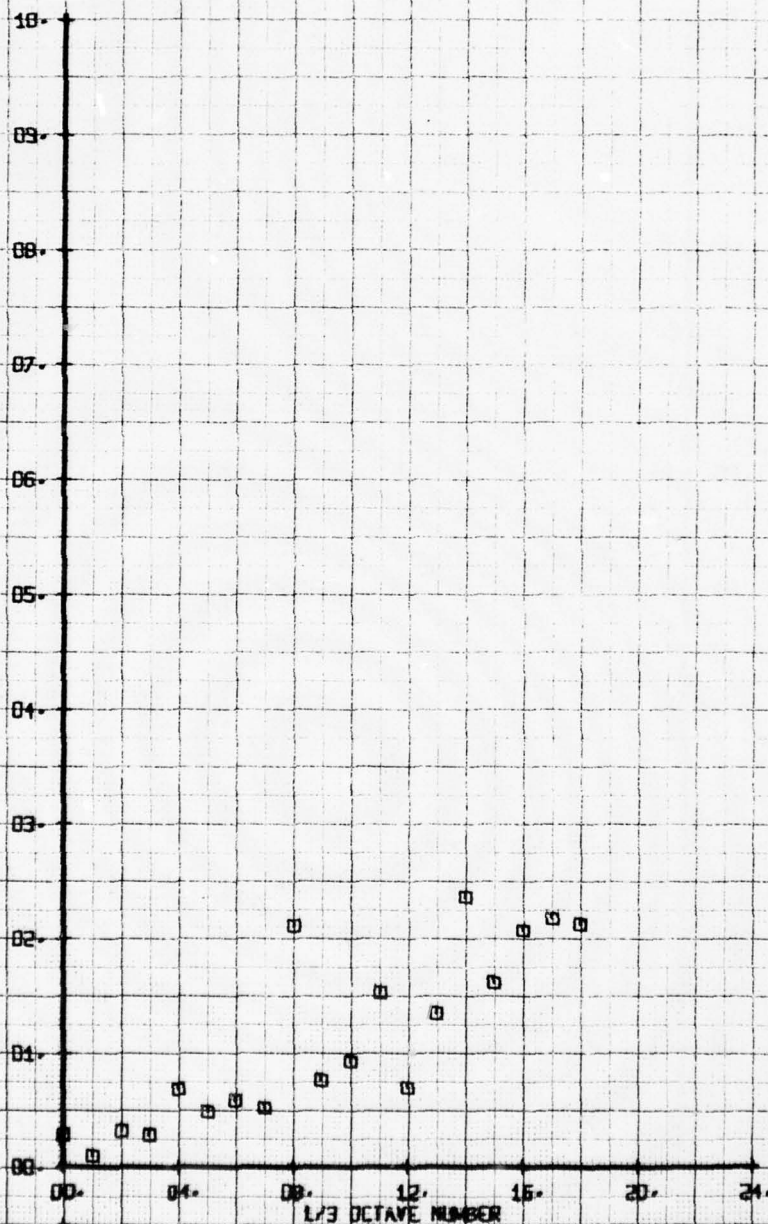


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 130 TO 7

SYM
 □

LEGEND
 CH 65
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



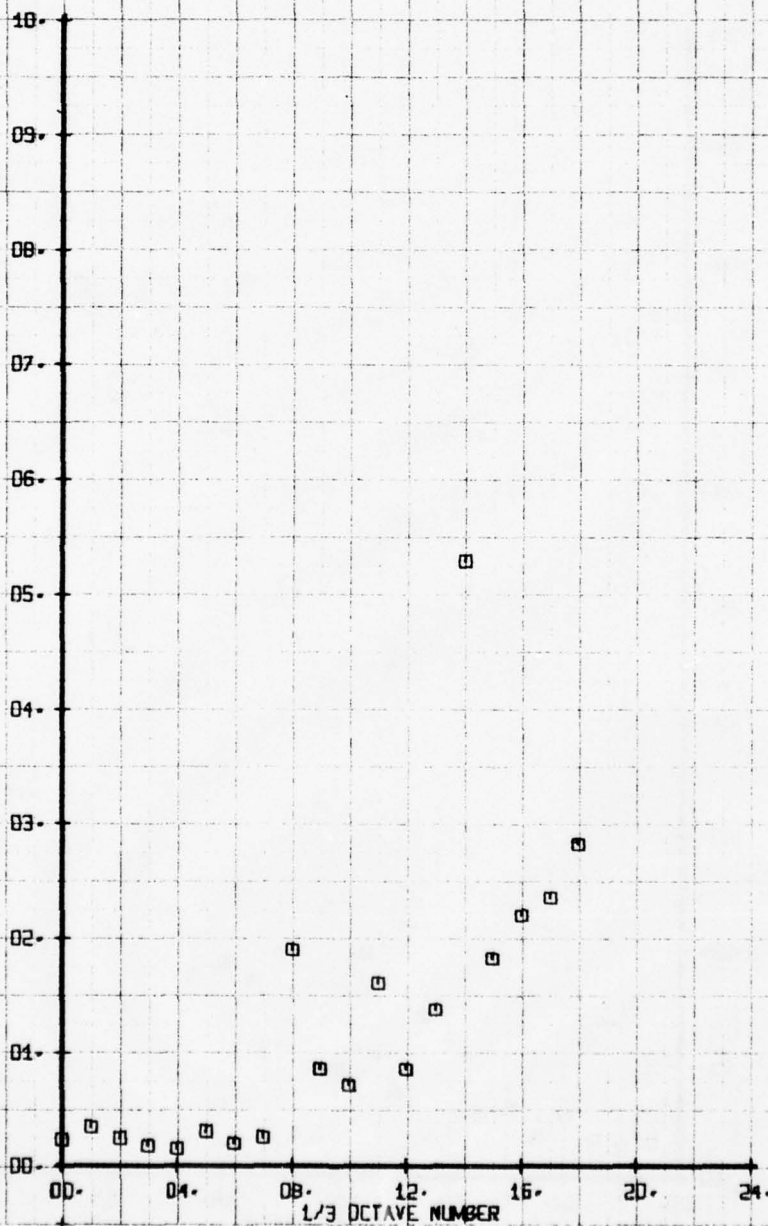
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 13B TP 8

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



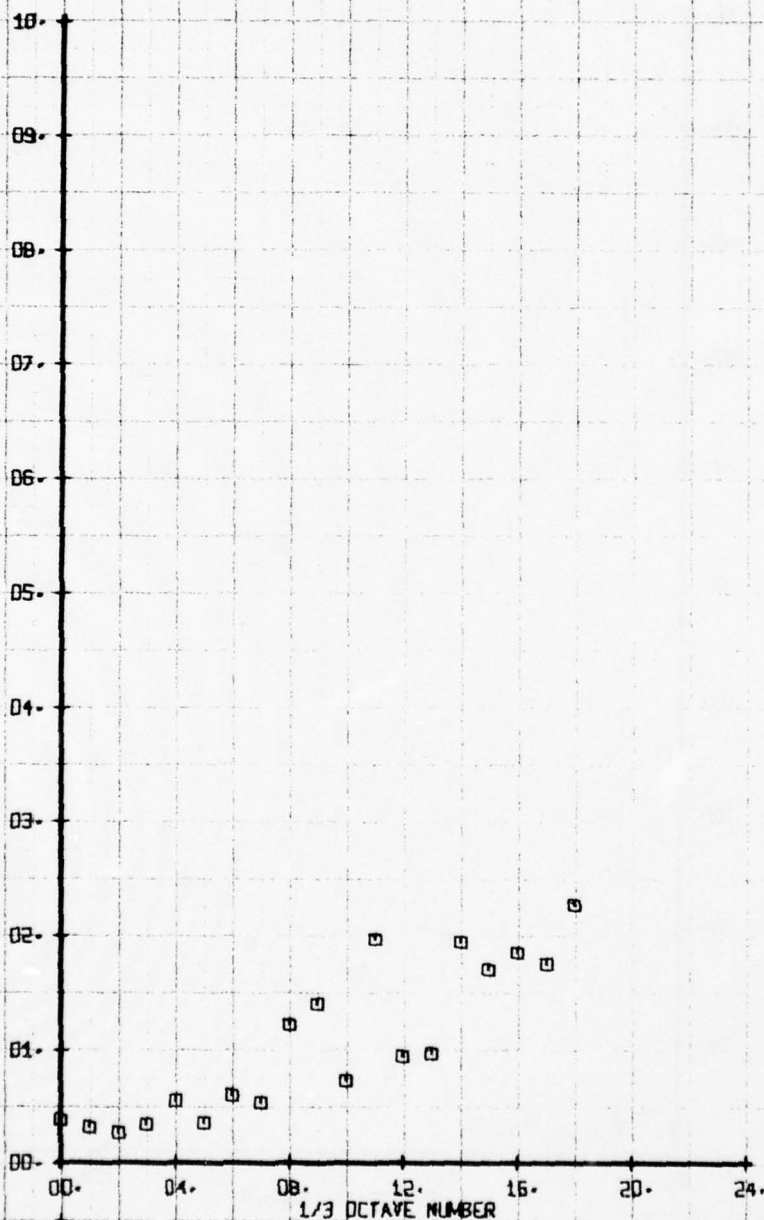
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 9

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

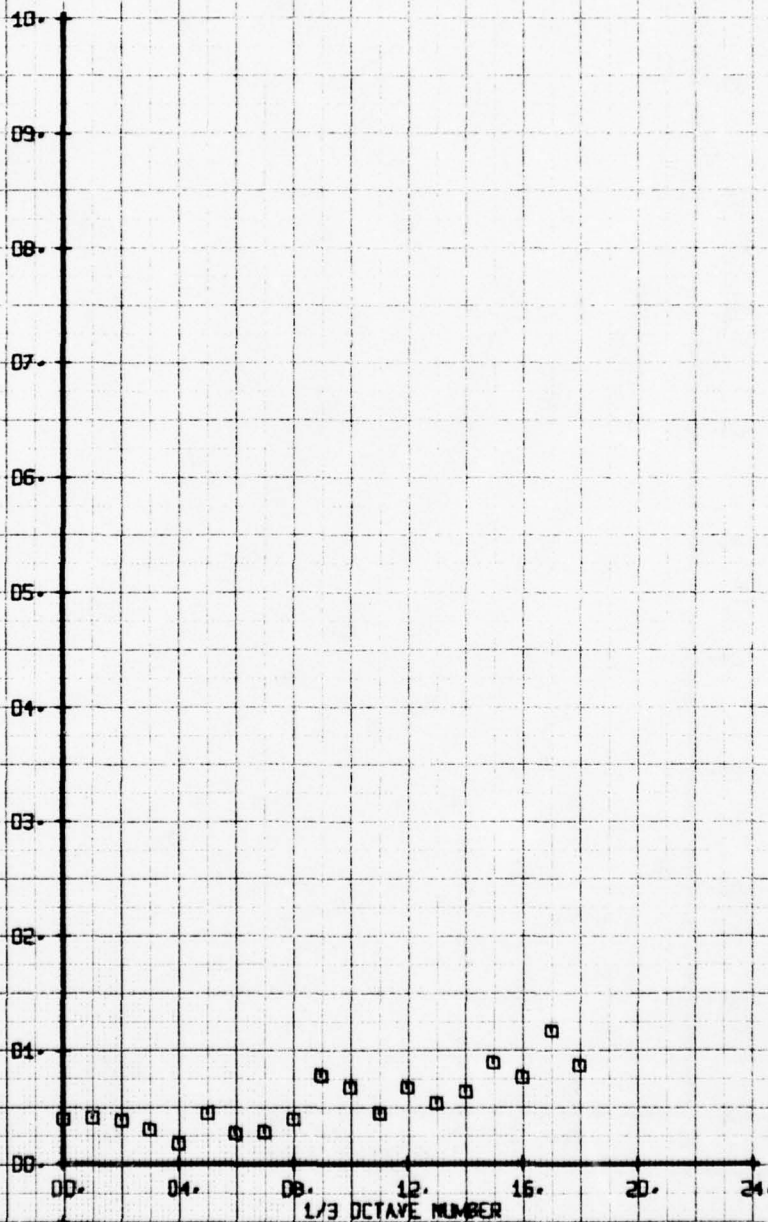
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 10

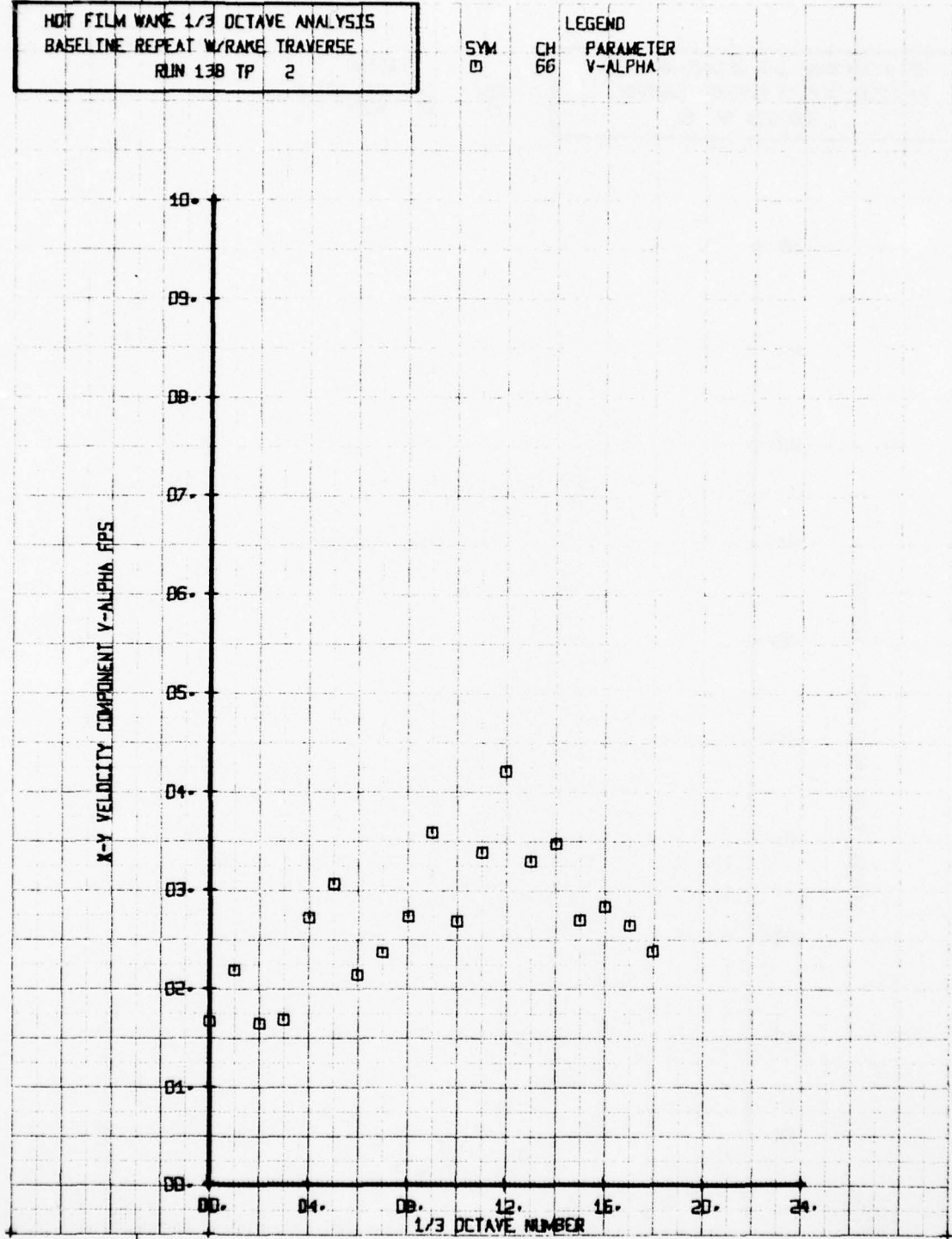
SYM	CH	LEGEND	PARAMETER
□	65		BETA

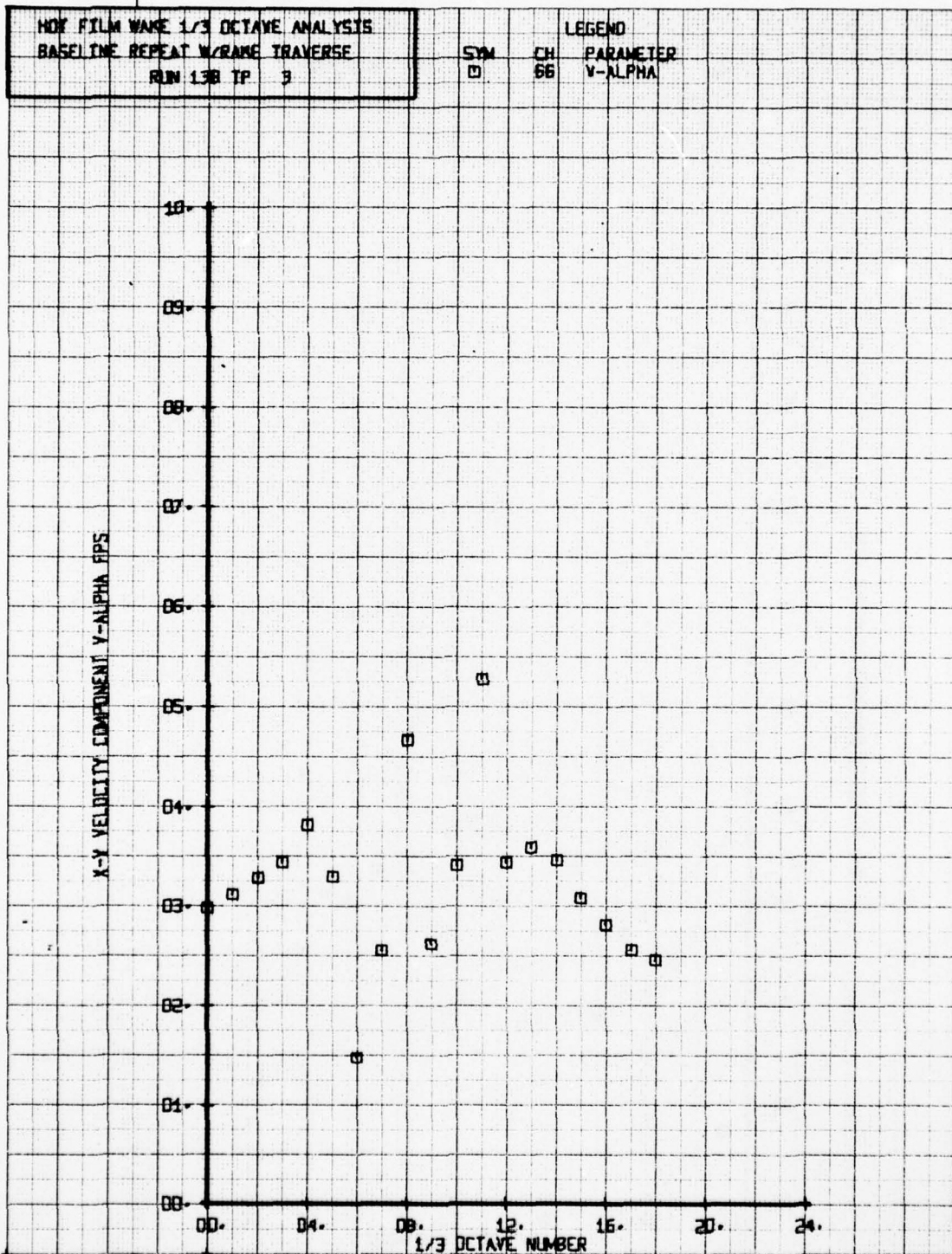
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT W/RAKE TRAVERSE
RUN 13B TP 2

SYM	CH	PARAMETER
□	66	V-ALPHA

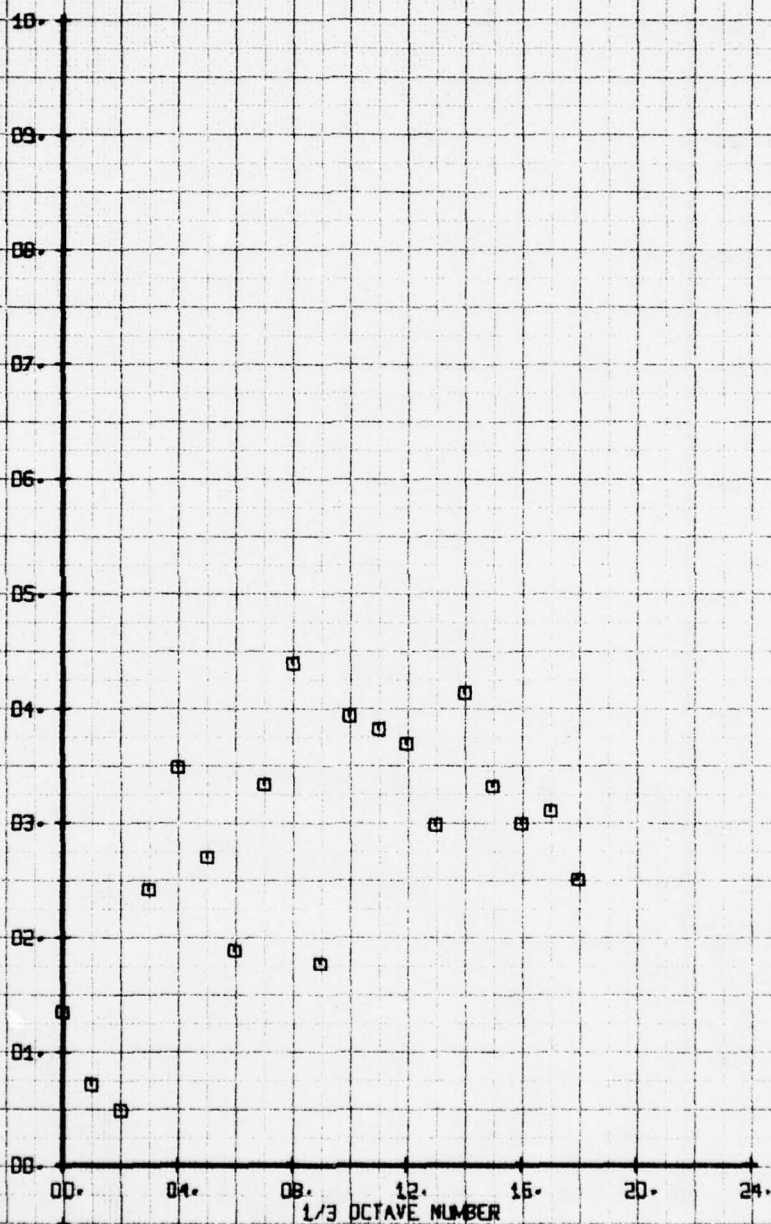




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 13B TP 4

LEGEND		
SYM	CH	PARAMETER
□	66	V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



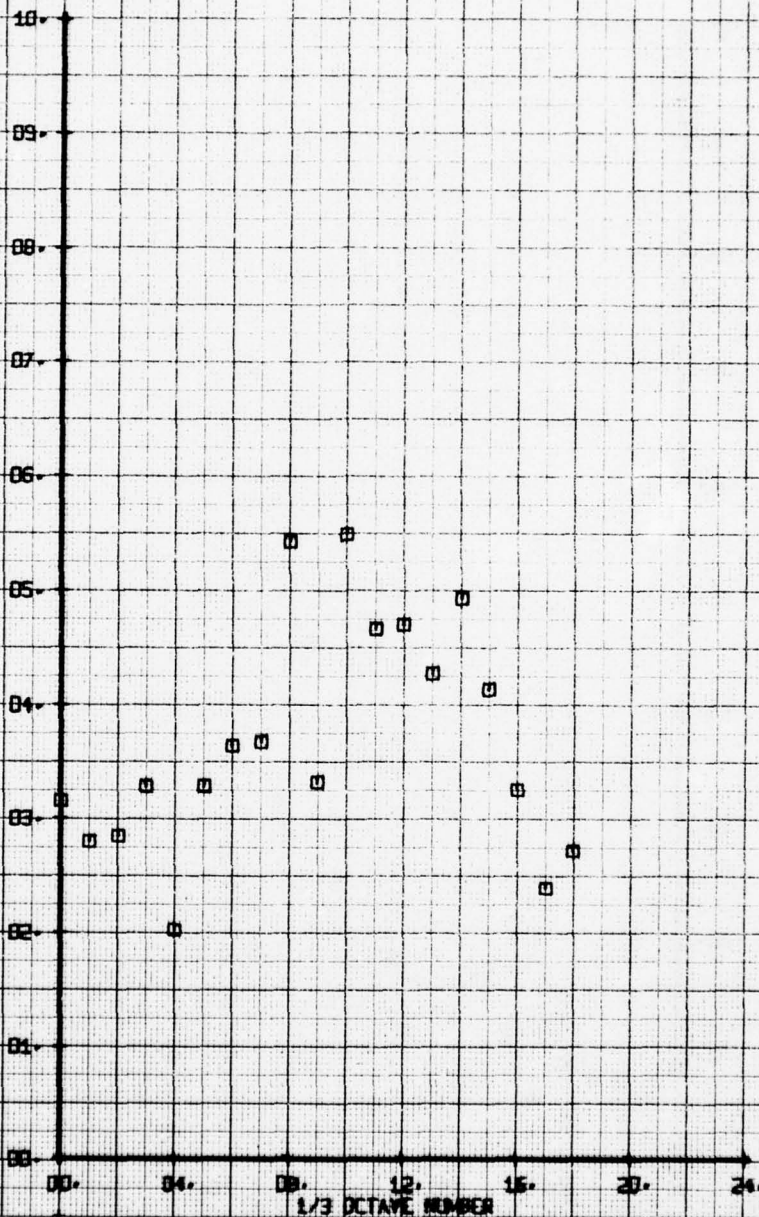
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RANGE TRAVERSE
 RUN 138 TP 5

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

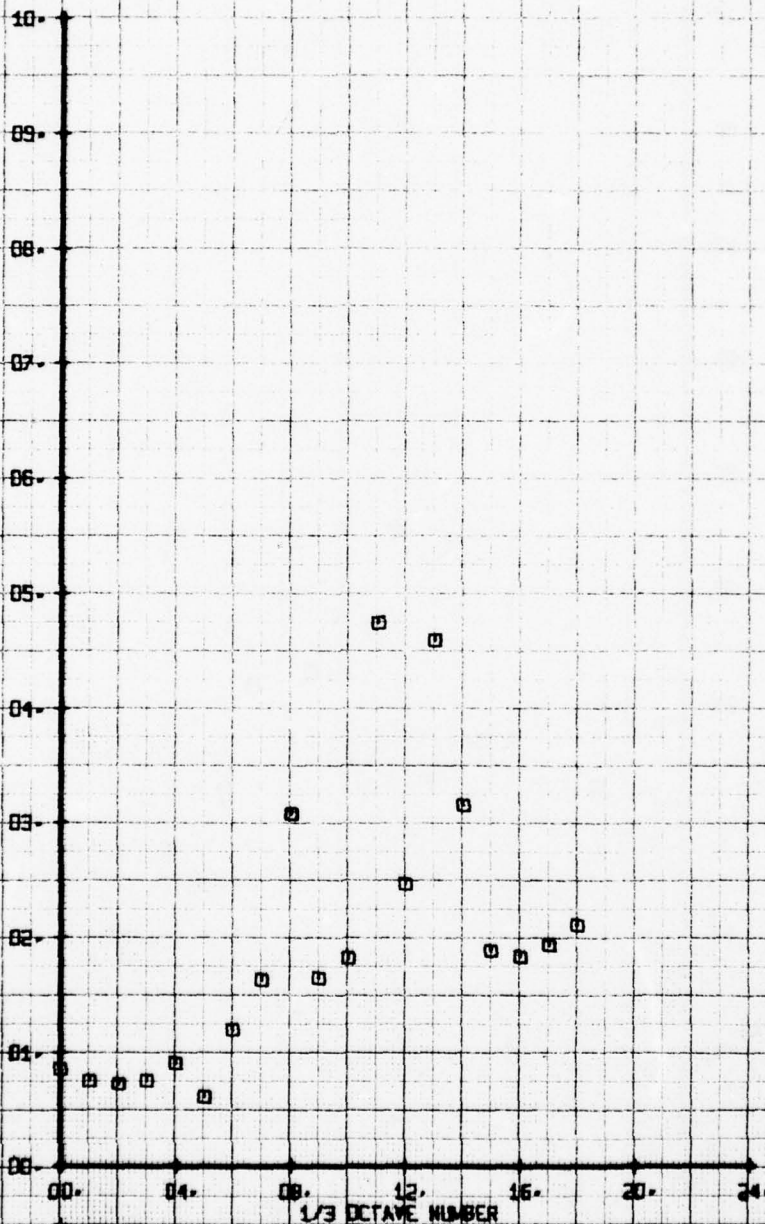
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 6

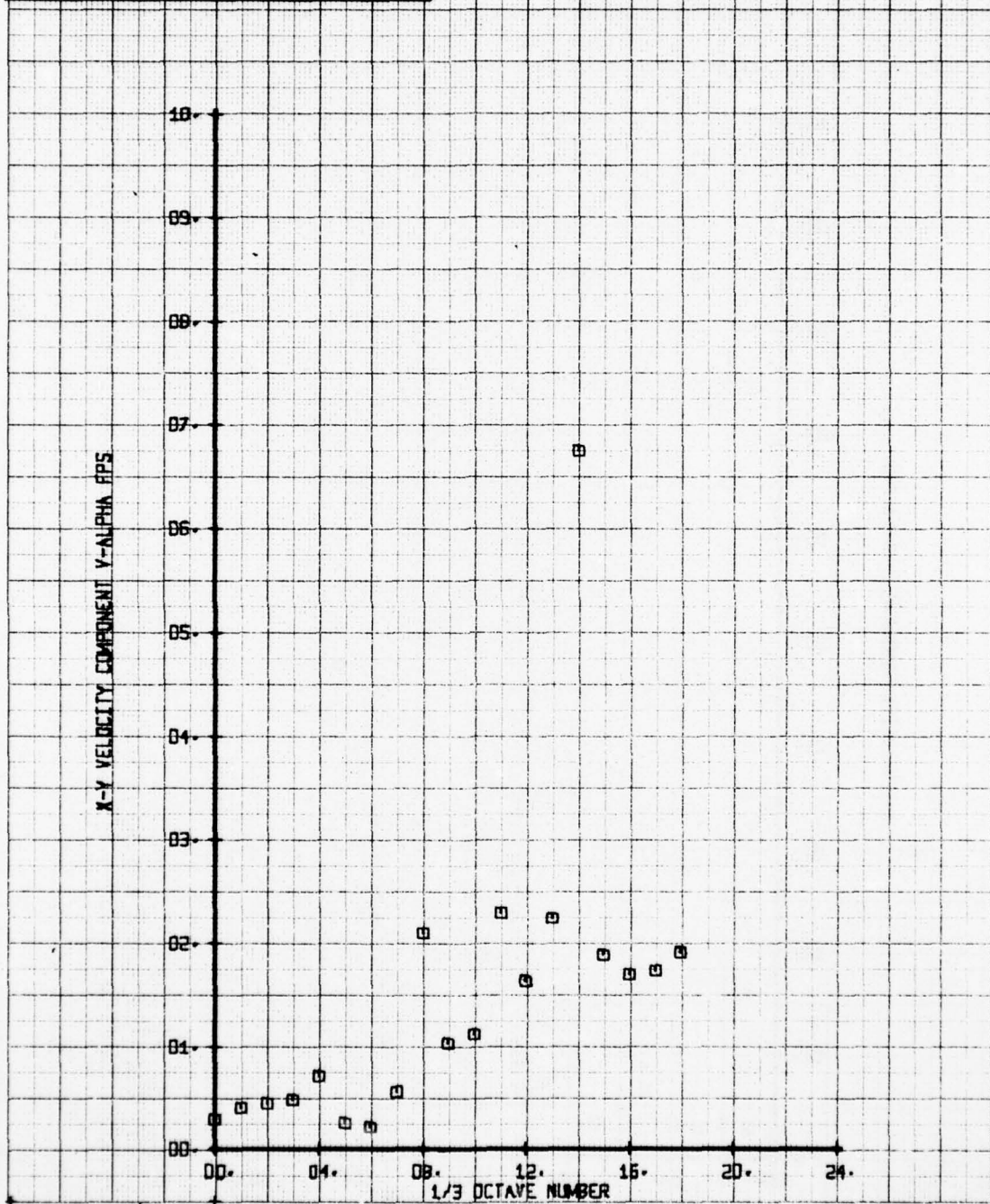
LEGEND
 CH 66
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/BASE TRAVERSE
 RUN 138 TP 7

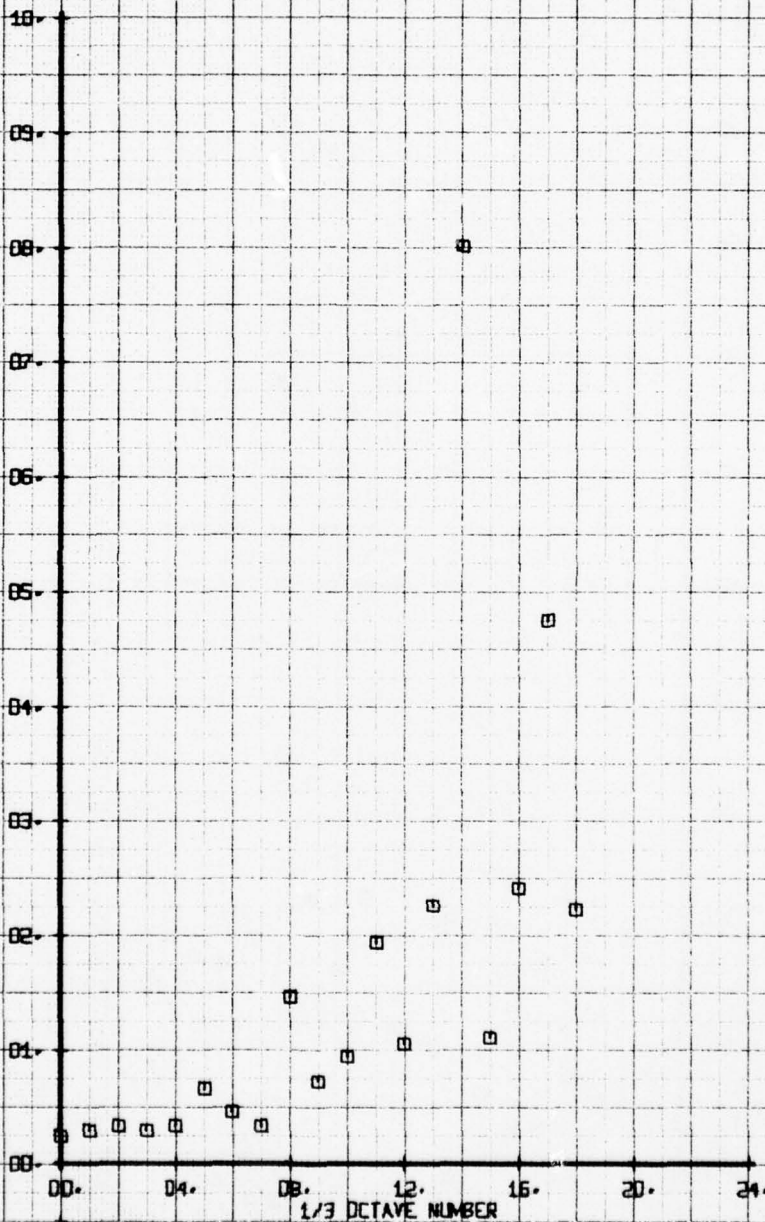
LEGEND
 CH 66
 PARAMETER
 V-ALPHA
 SYM □



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 8

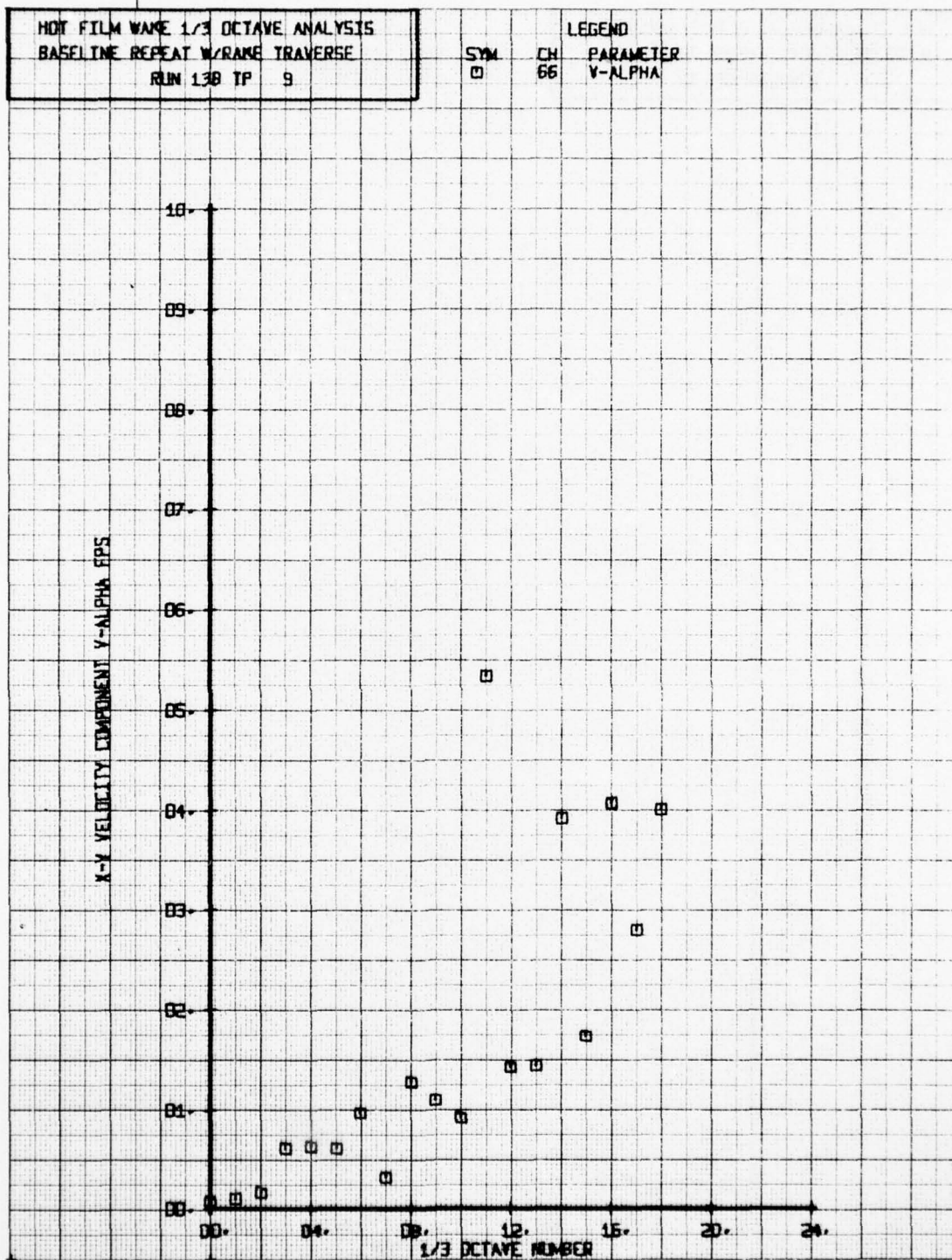
LEGEND
 CH 66
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAME TRAVERSE
 RUN 138 TP 9

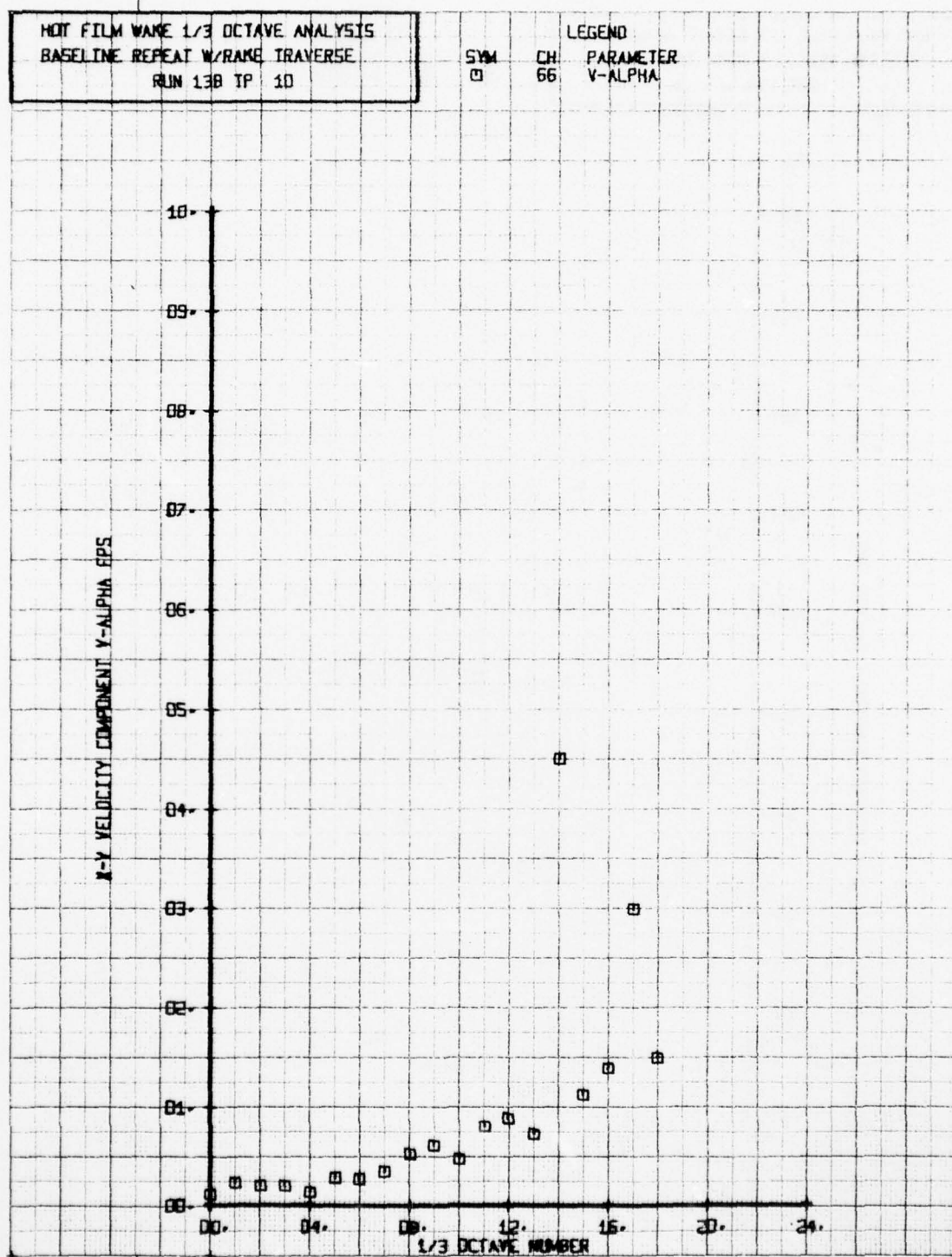
LEGEND
 CH 66
 PARAMETER
 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 13B TP 10

LEGEND
 CH 66
 PARAMETER
 V-ALPHA

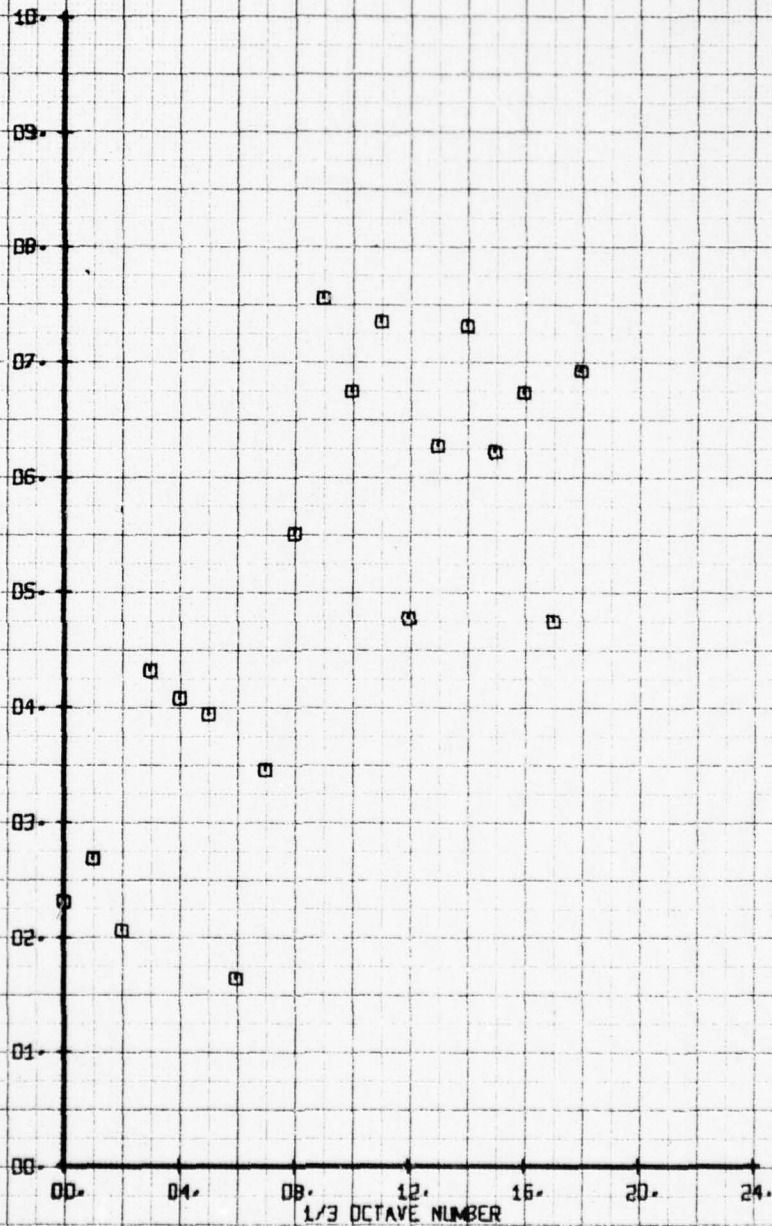
X-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 130 TP 2

SYM CH PARAMETER
 □ BS V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)
SEP 78 P F SHERIDAN

F/G 1/3

DAAJ02-77-C-0020

USARTL-TR-78-23D

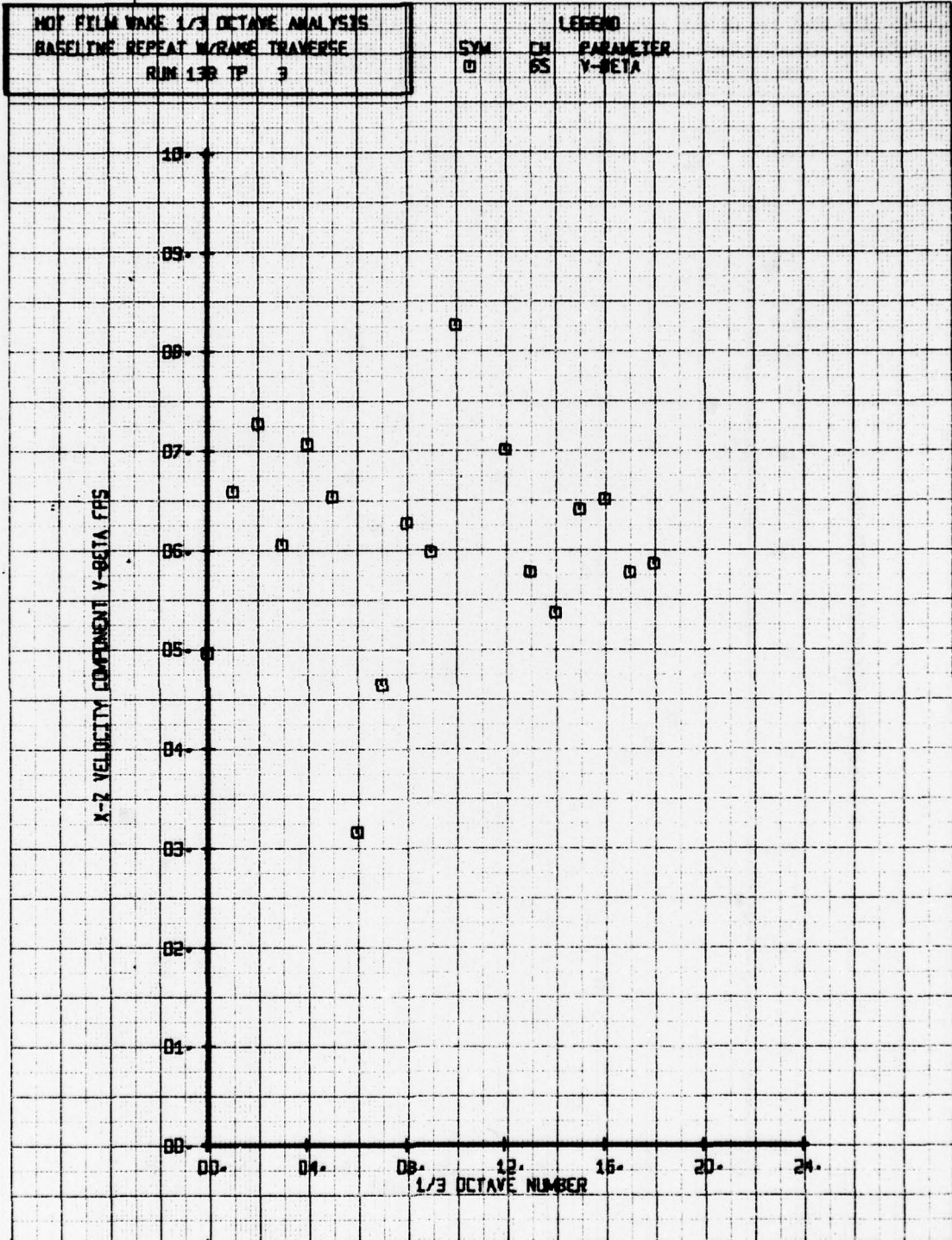
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2 OF 4

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A063 000





HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 4

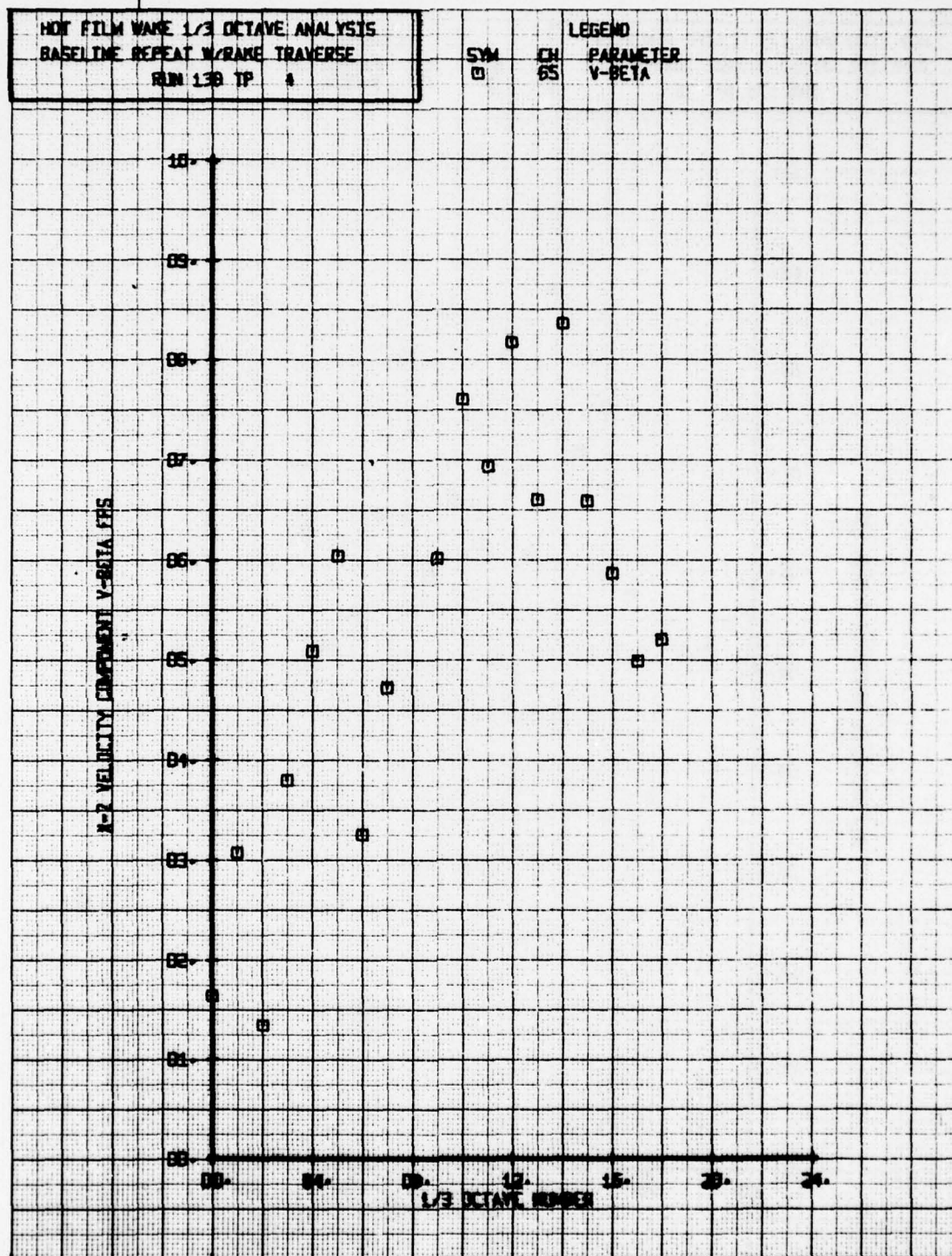
SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

A-2 VELOCITY COMPONENT V-BETA FHS

1/3 OCTAVE NUMBER



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RAKE TRAVERSE
 RUN 138 TP 5

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

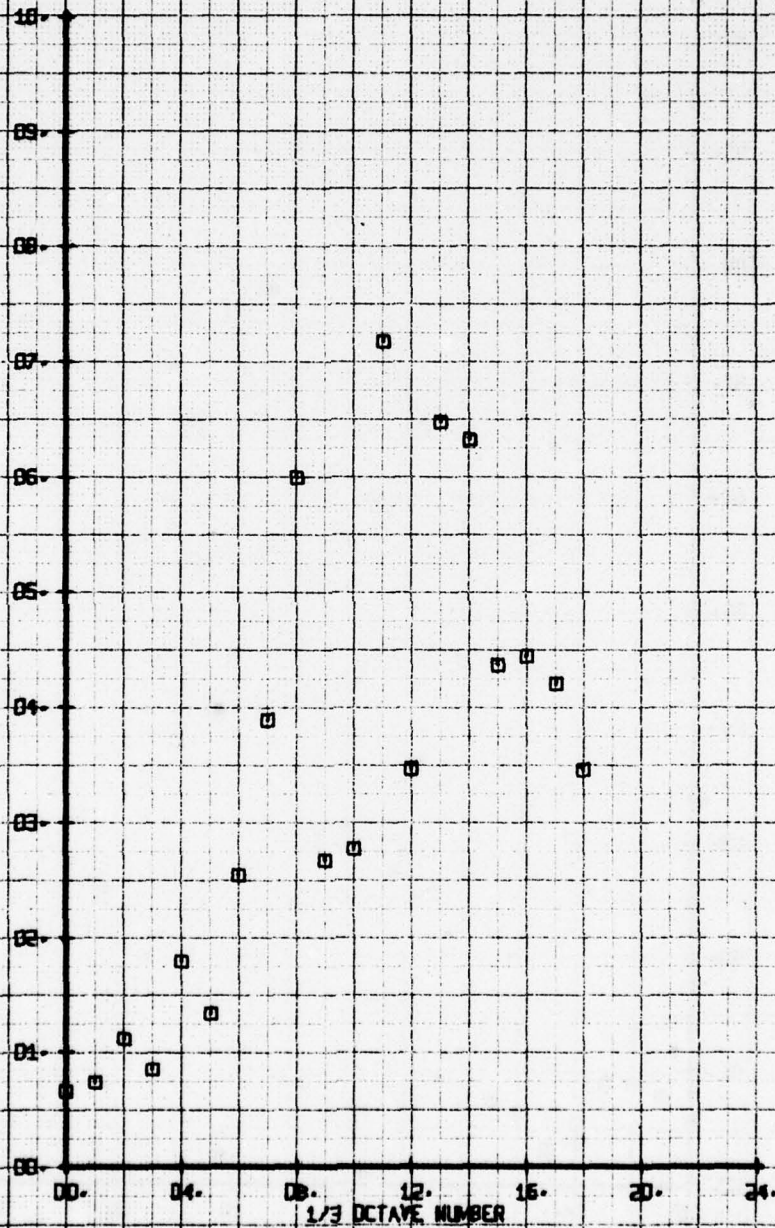
X-2 VELOCITY COMPONENT V-BETA CFS

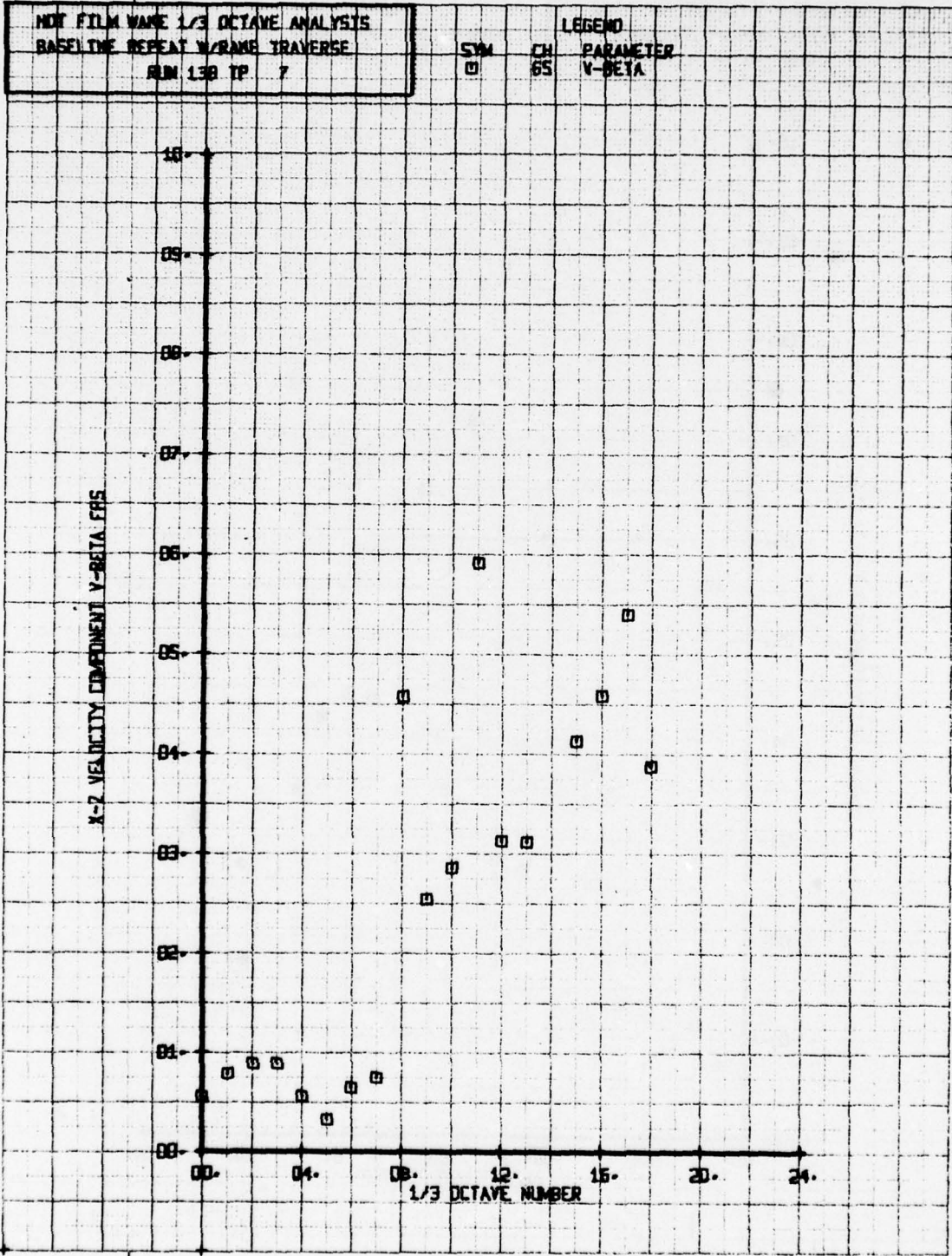
1/3 OCTAVE NUMBER

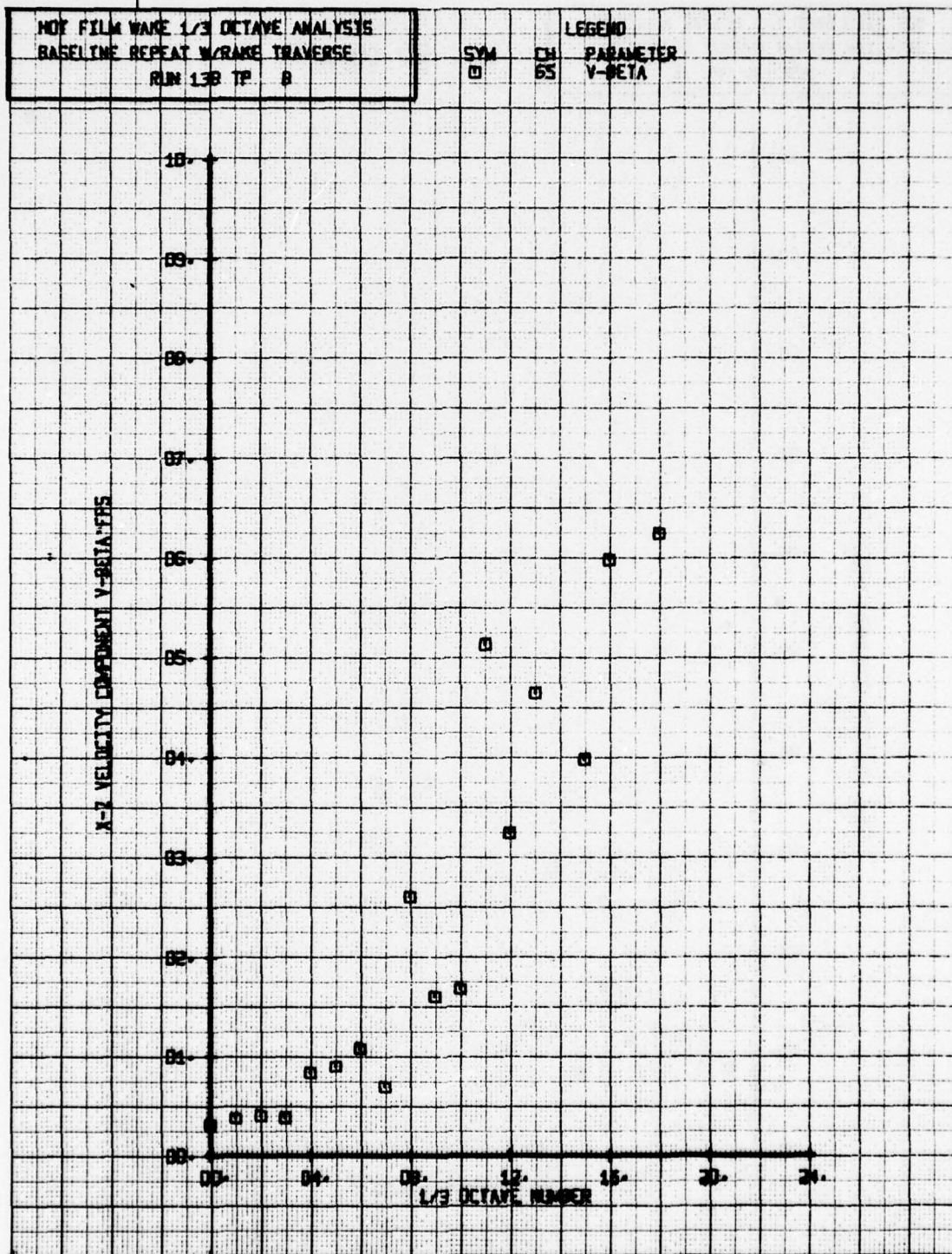
NOI FILM WARE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT W/RANE TRAVERSE
 RUN 138 TP 6

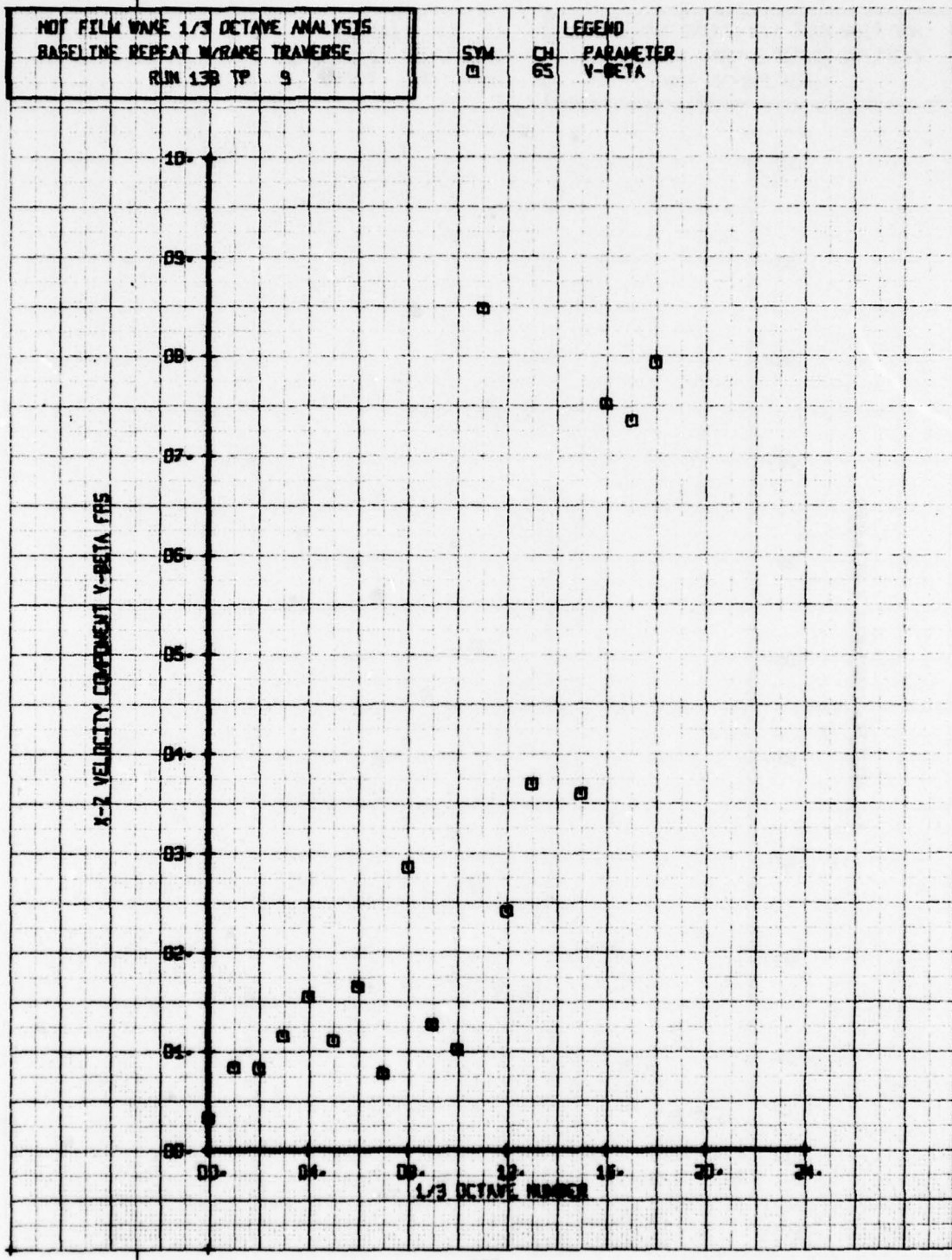
SYN CH PARAMETER
 0 65 V-BETA

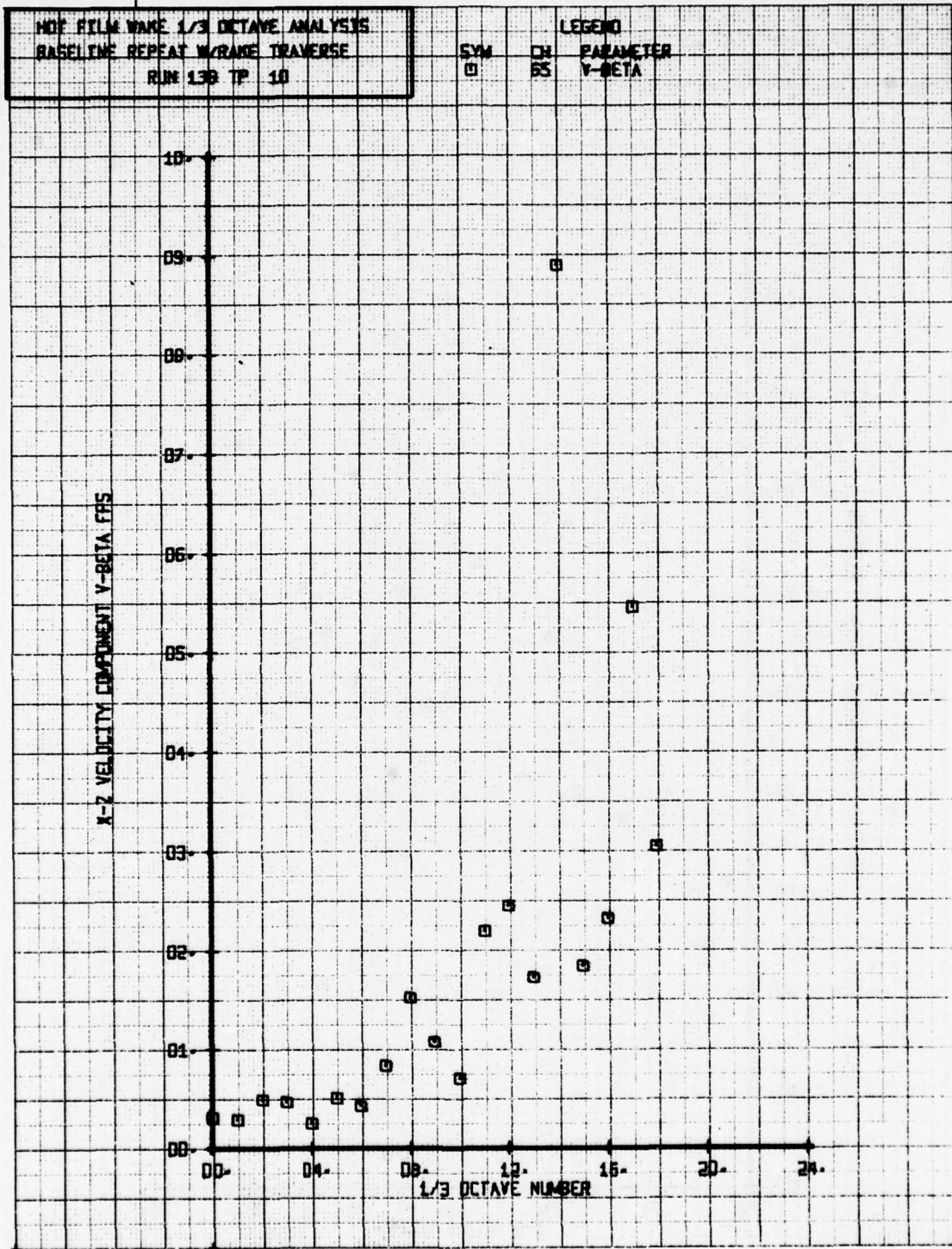
K-2 VELOCITY COMPONENT V-BETA FPS





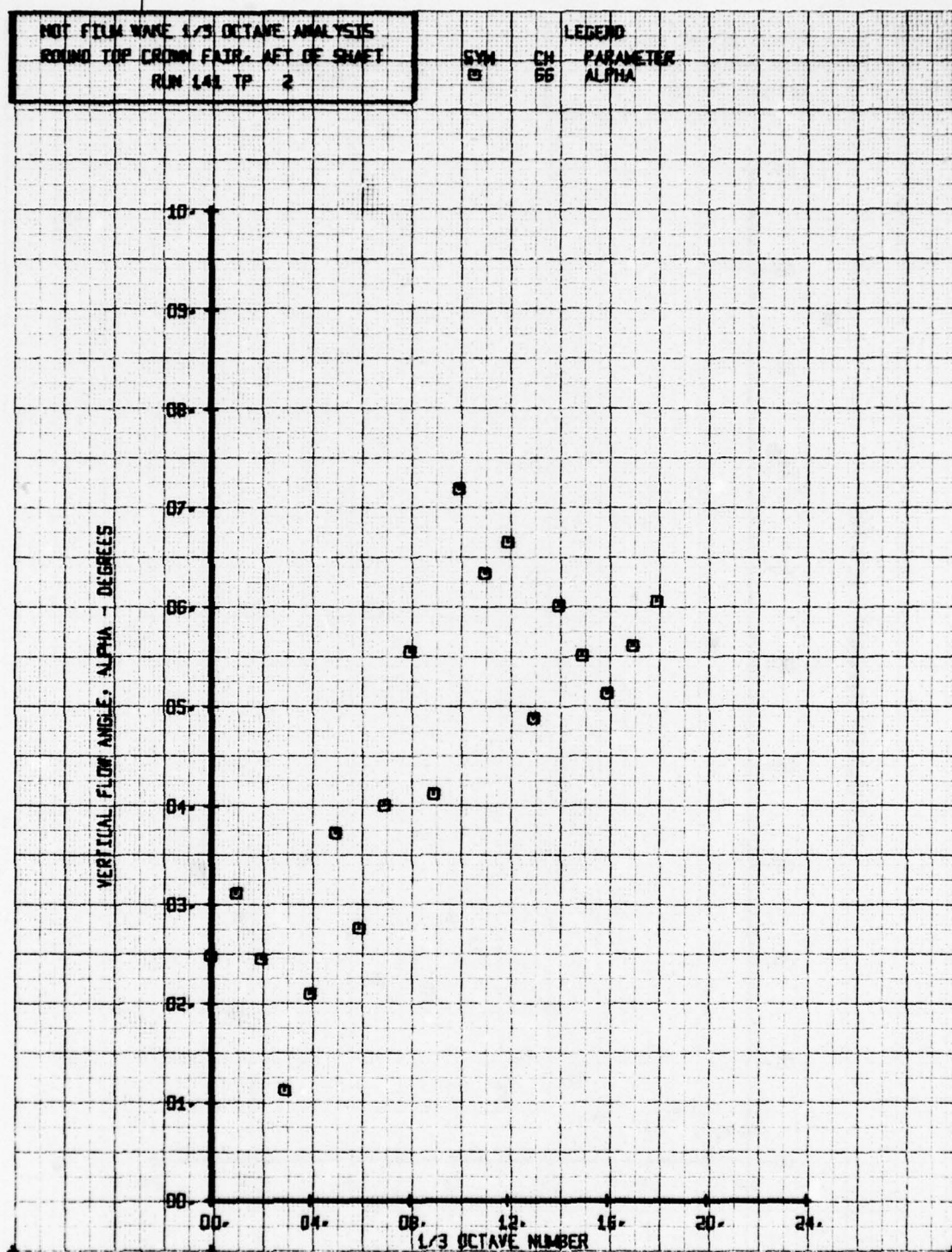






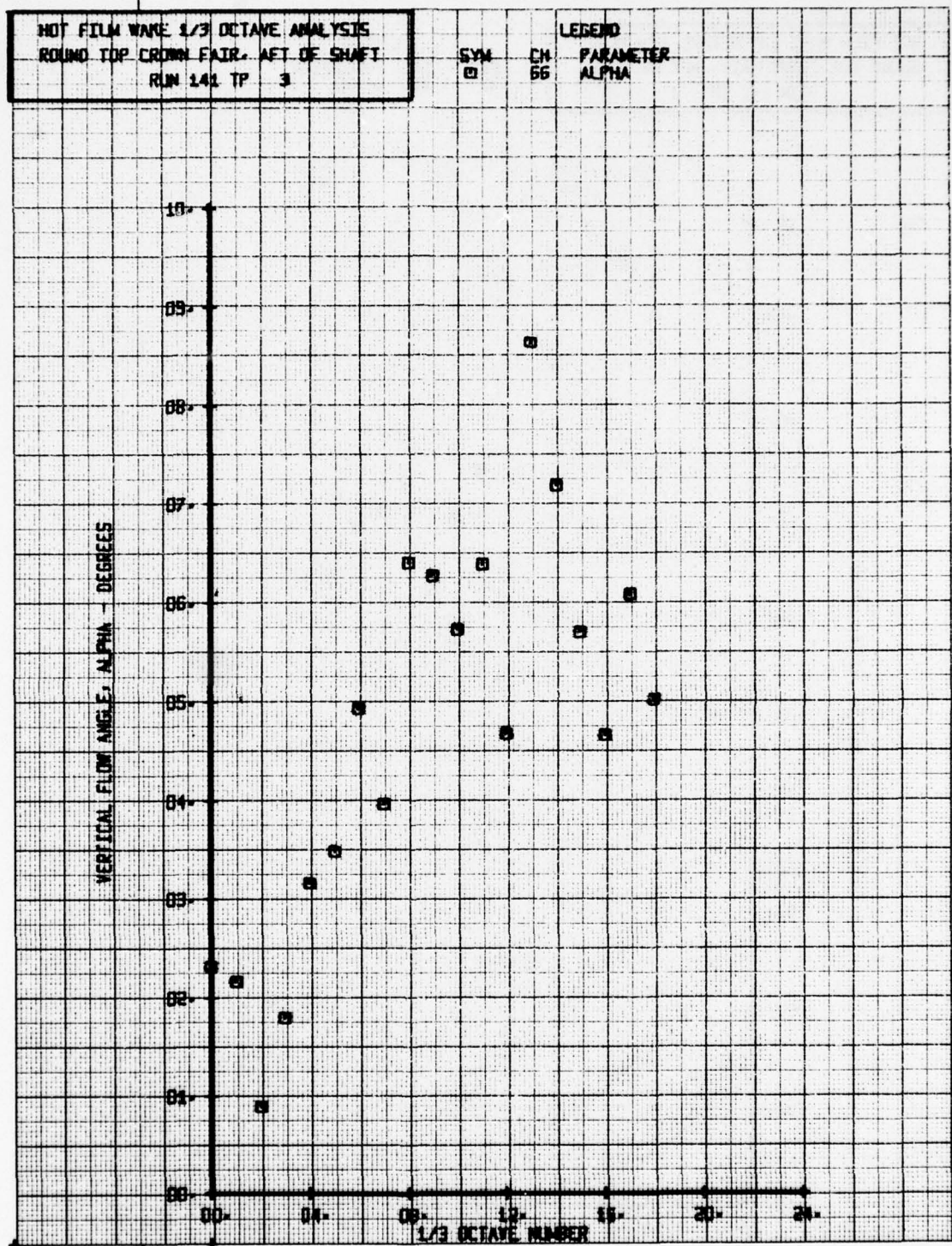
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR, AFT OF SHAFT
 RUN 141 TP 2

SYN CH
 6 66
 PARAMETER
 ALPHA



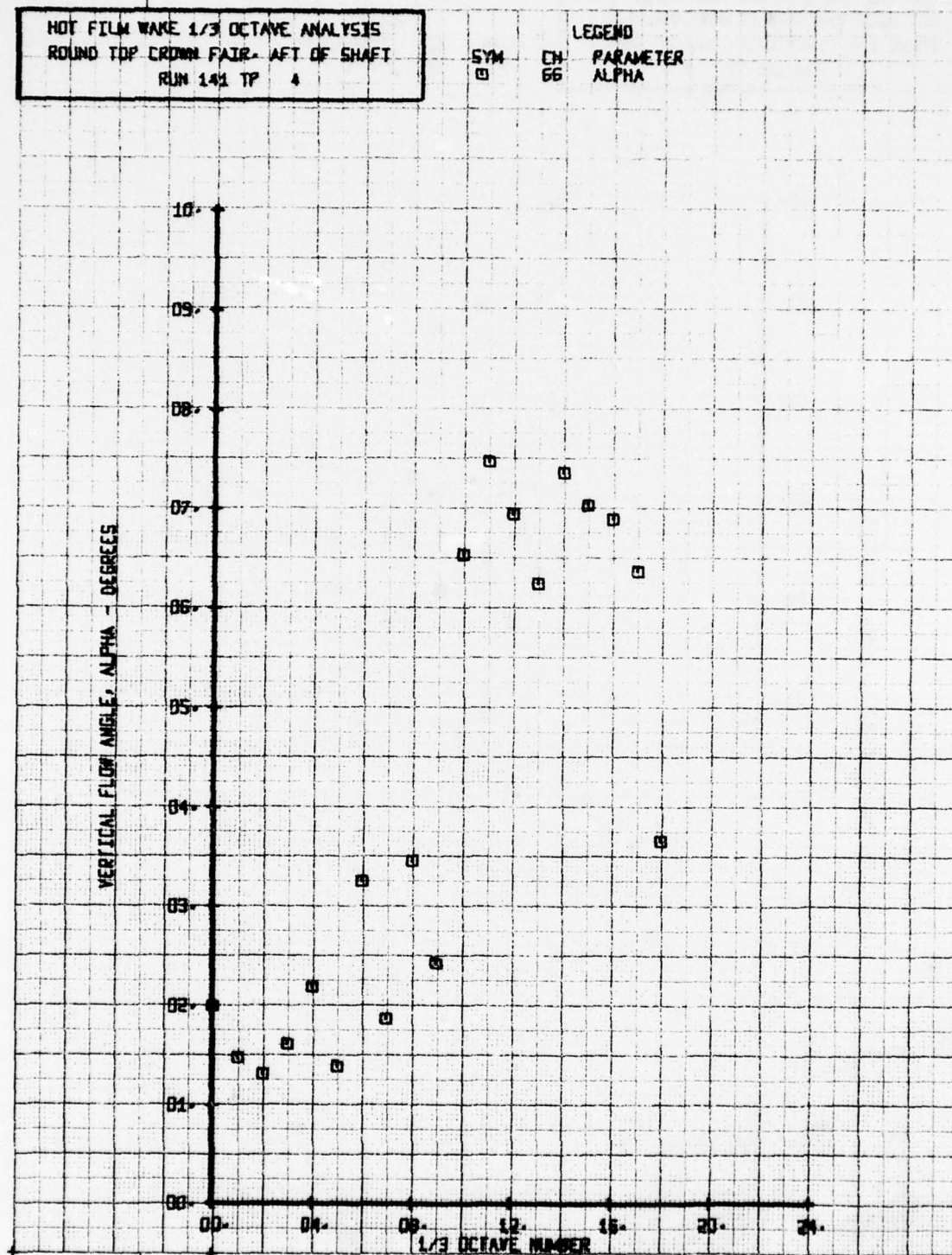
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 TP 3

LEGEND
 SYM CH PARAMETER
 □ 56 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR-AFT OF SHAFT
 RUN 141 TP 4

SYM CH PARAMETER
 □ 66 ALPHA



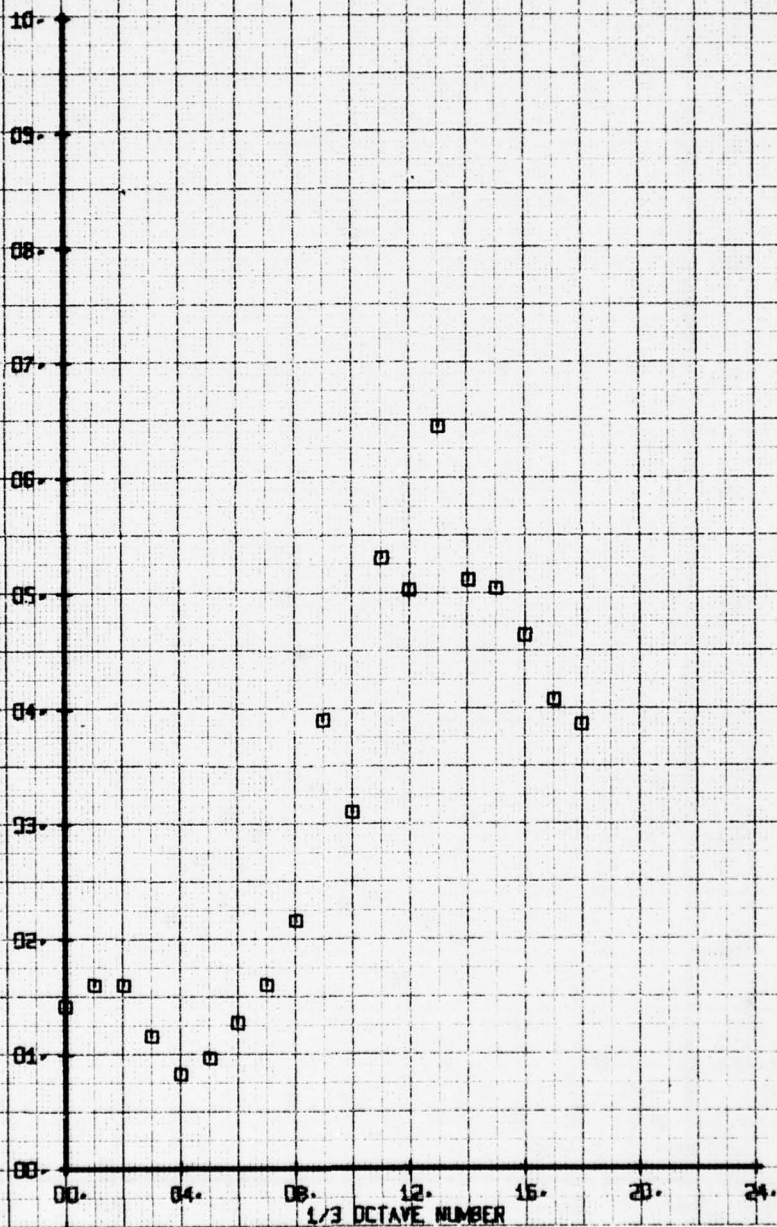
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR - AFT OF SHAFT
 RUN 141 TP 5

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



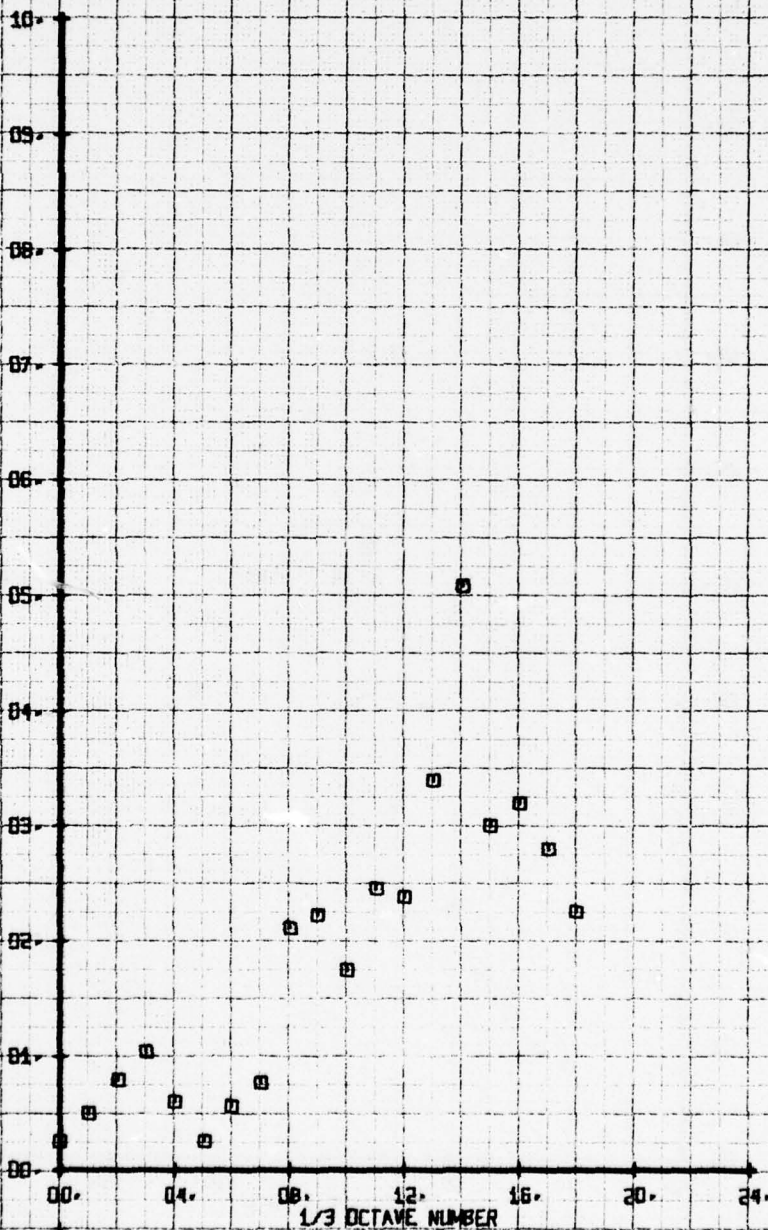
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 TP 5

SYM
 01

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

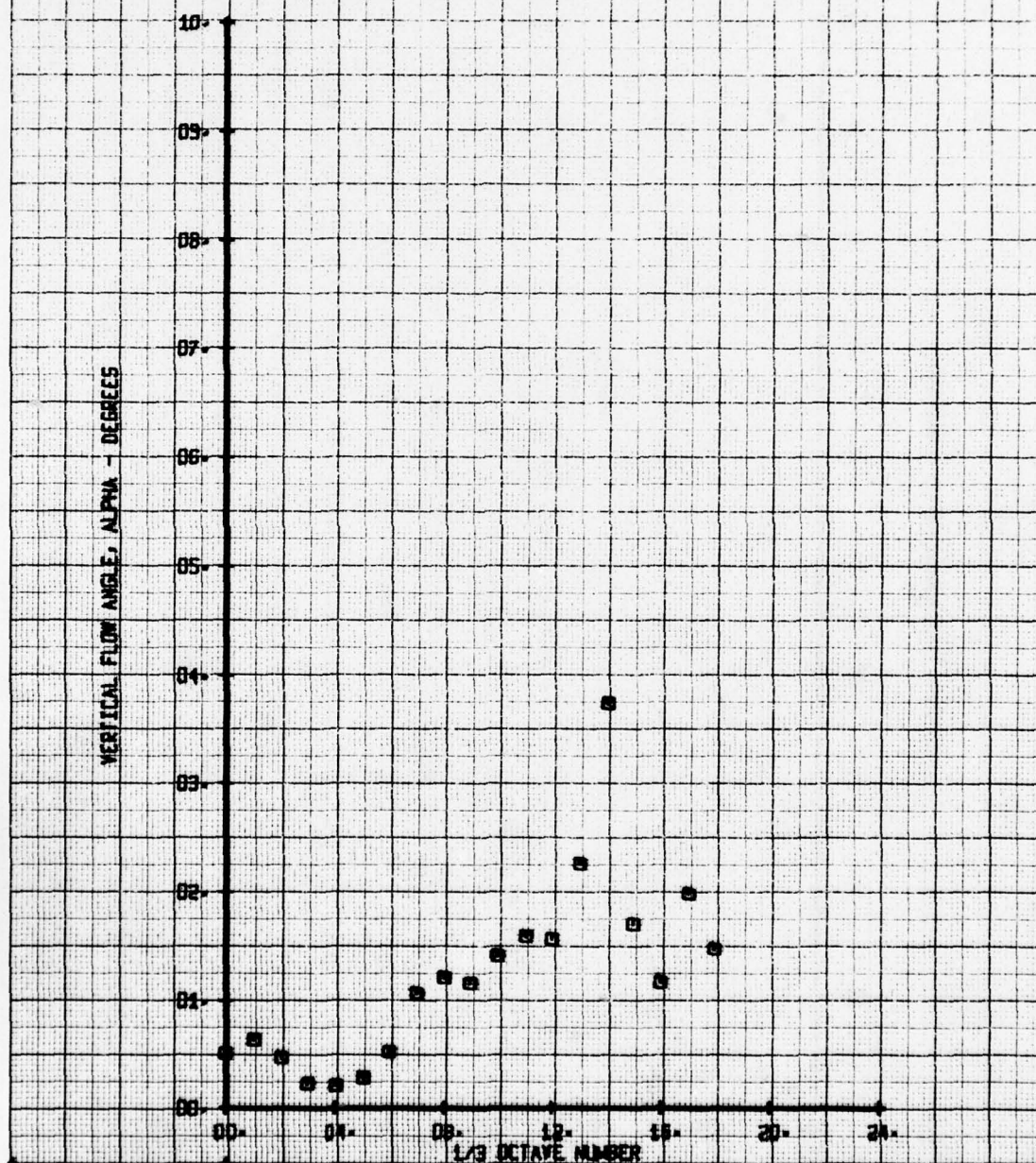


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR - AFT OF SHAFT
 RUN 141 TP 7

SYM
 □

CH
 56

LEGEND
 PARAMETER
 ALPHA

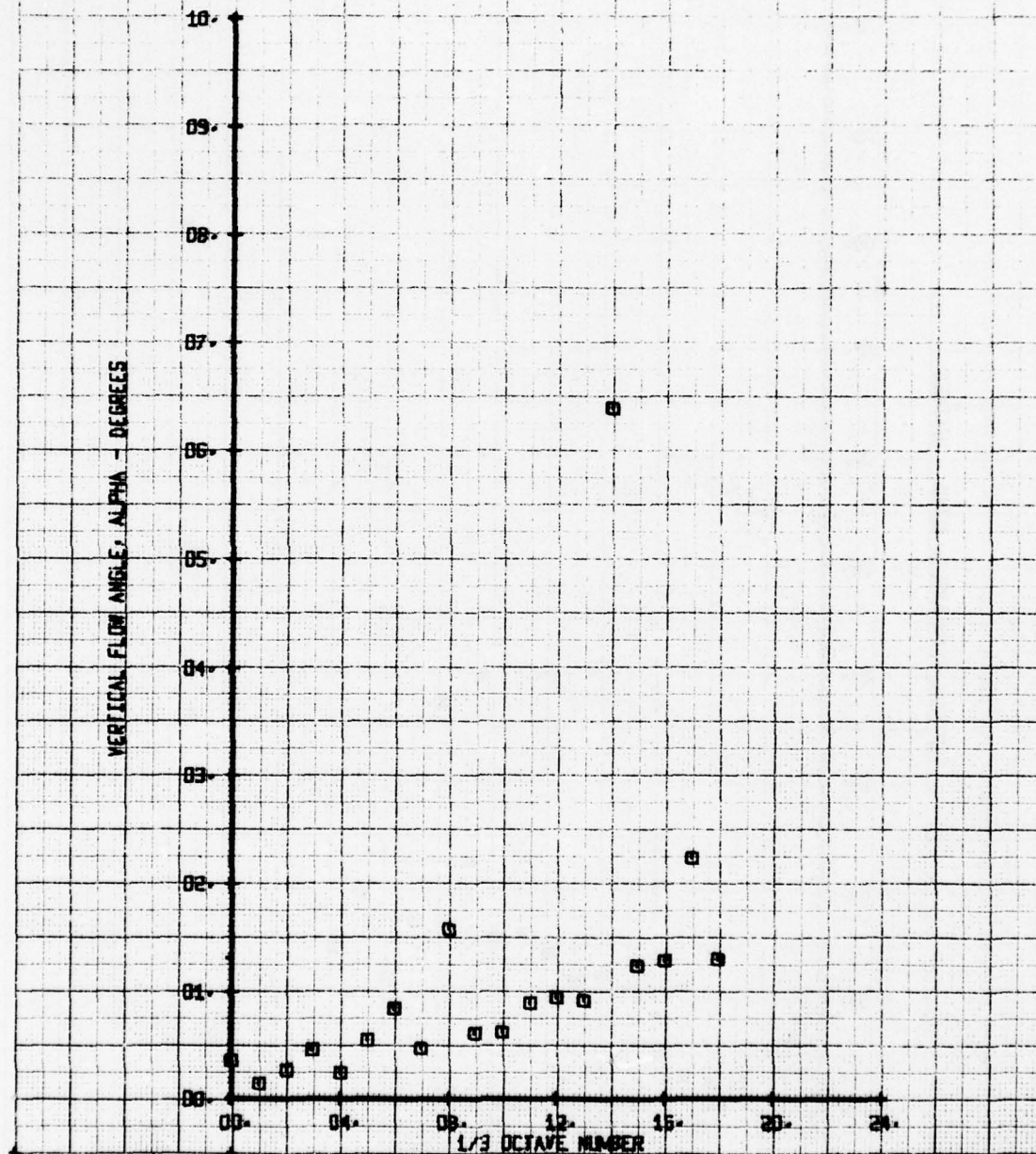


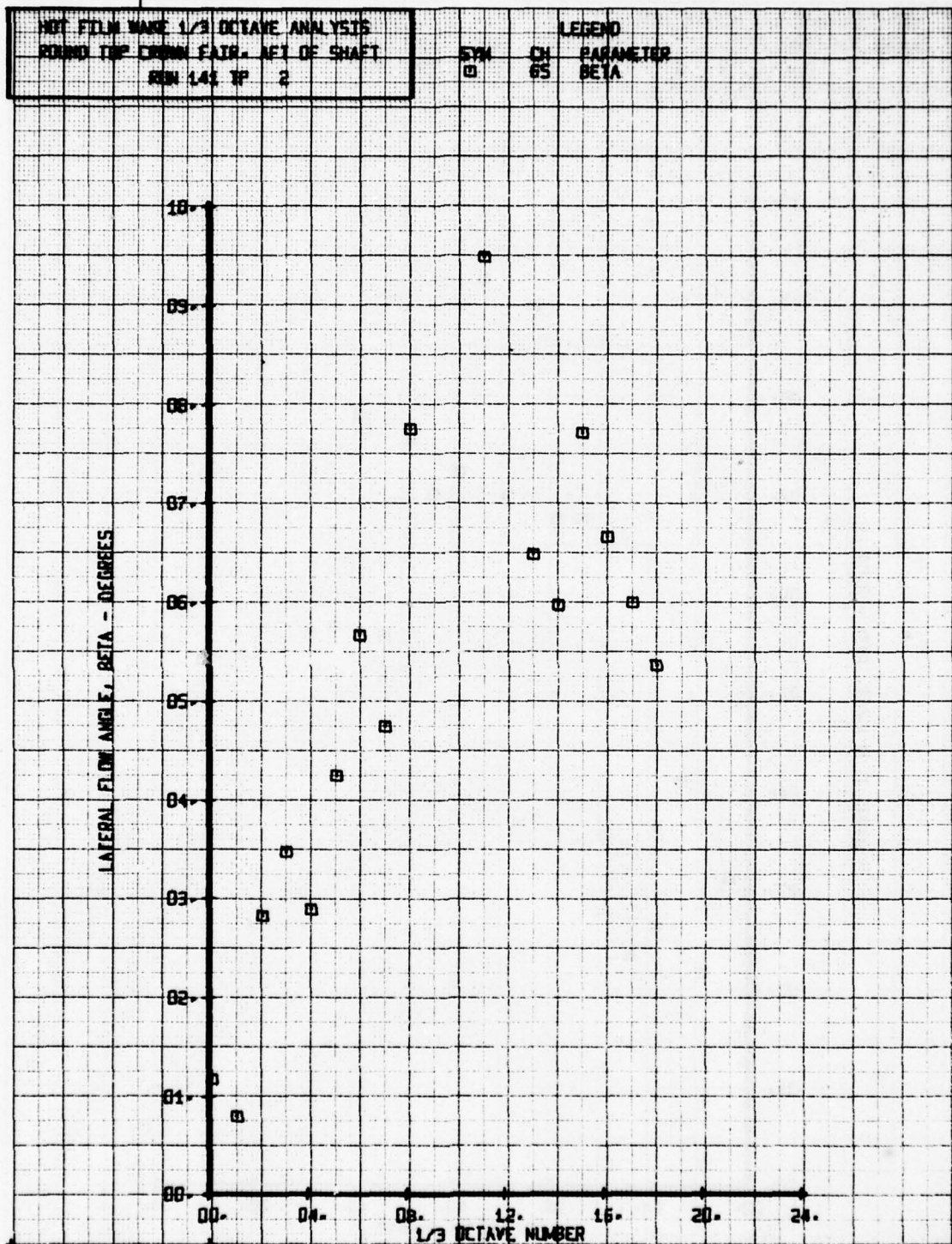
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHAFT
 RUN 141 TP 8

SYM
 □

LEGEND
 CH 66
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

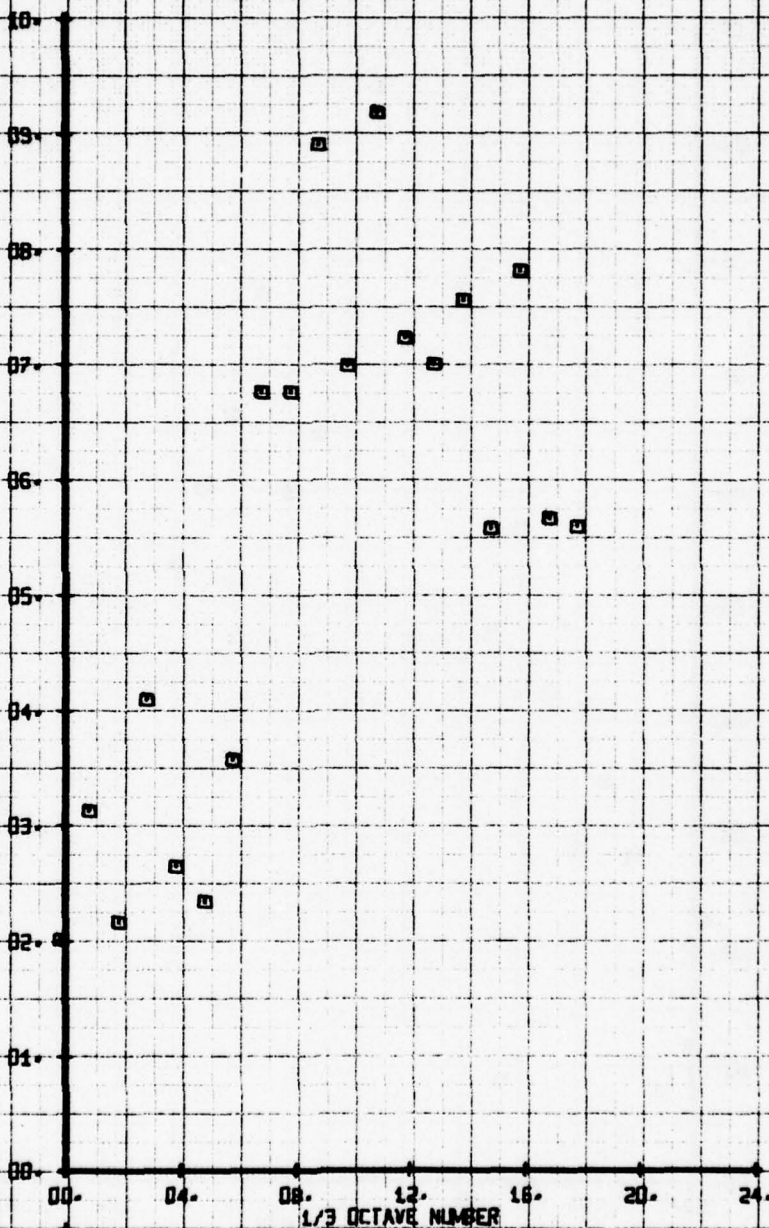




NOT FILM WARE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHAFT
 RUN 141 TP 3

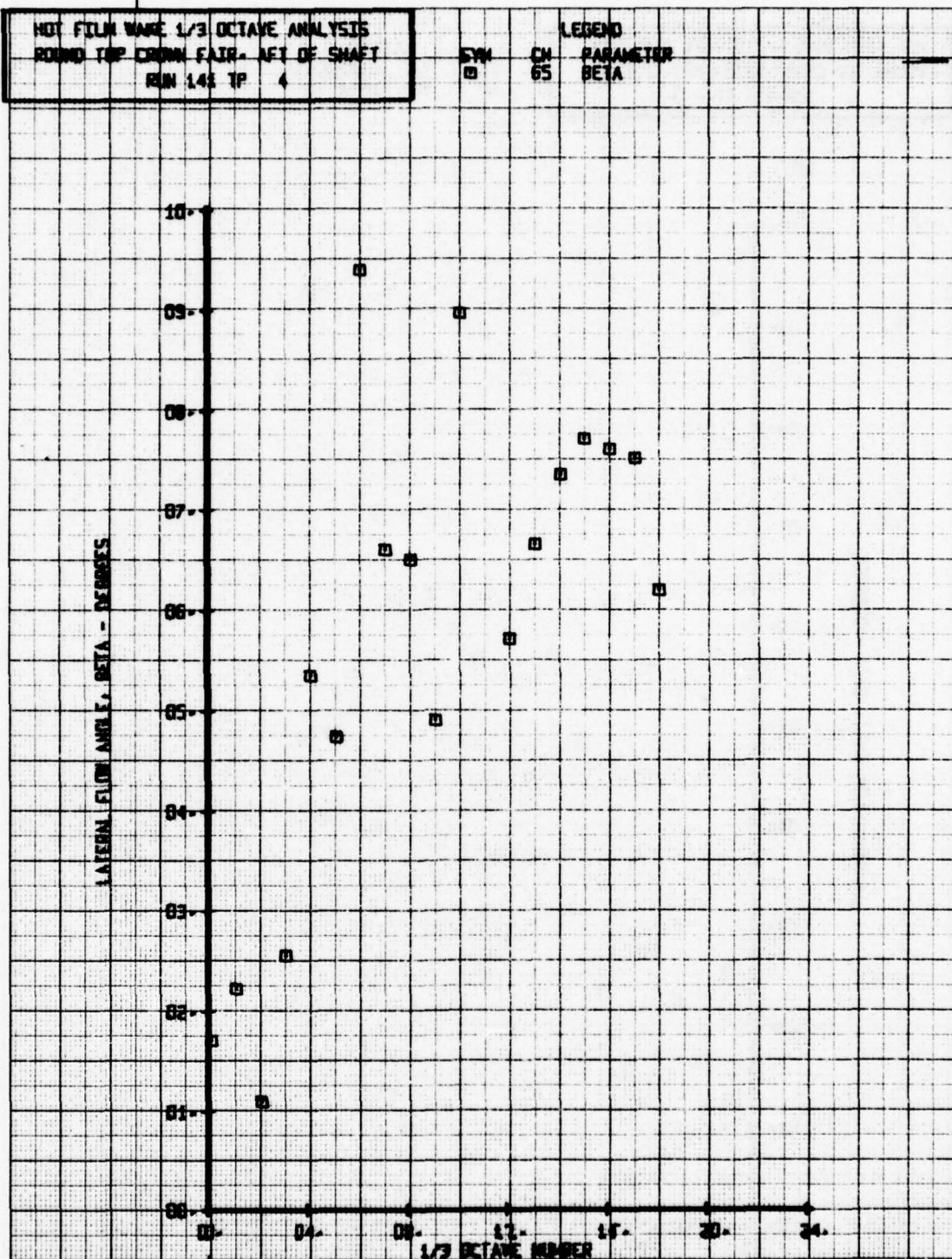
SYN CH
 05 05
 LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR - AFT OF SHAFT
 RUN 143 TP 4

SYM CH PARAMETER
 □ 65 BETA



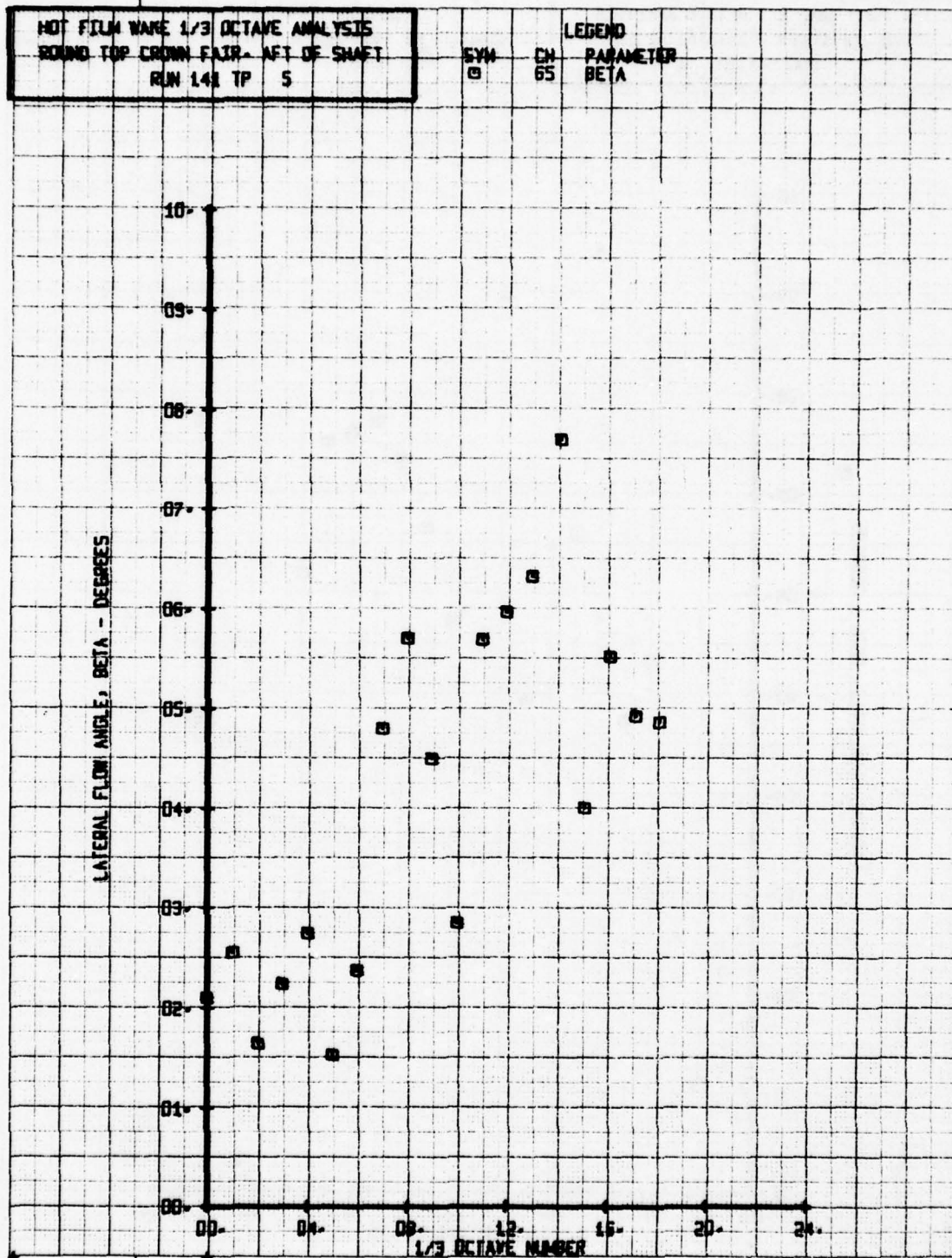
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR - AFT OF SHAFT
 RUN 148 TP 5

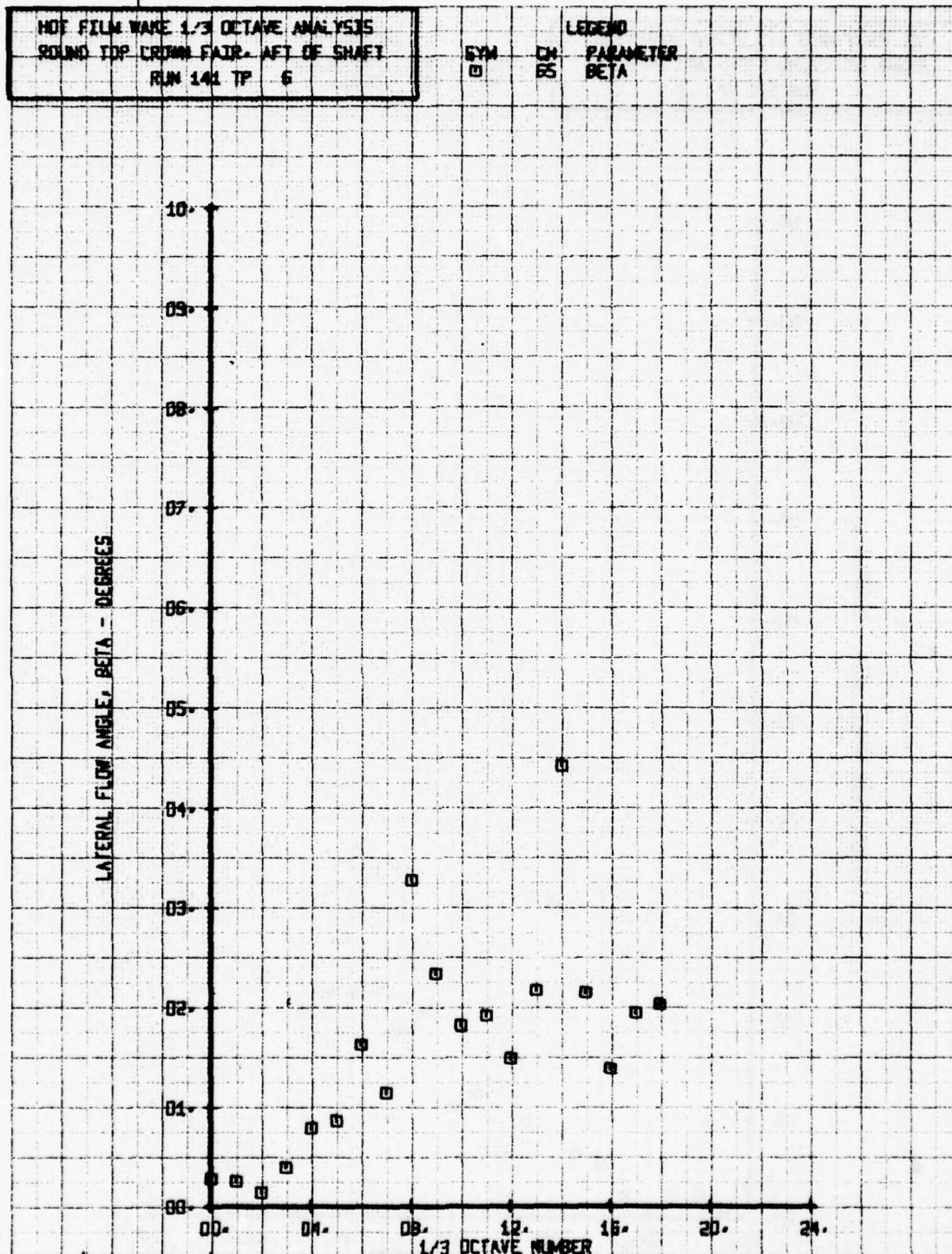
SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



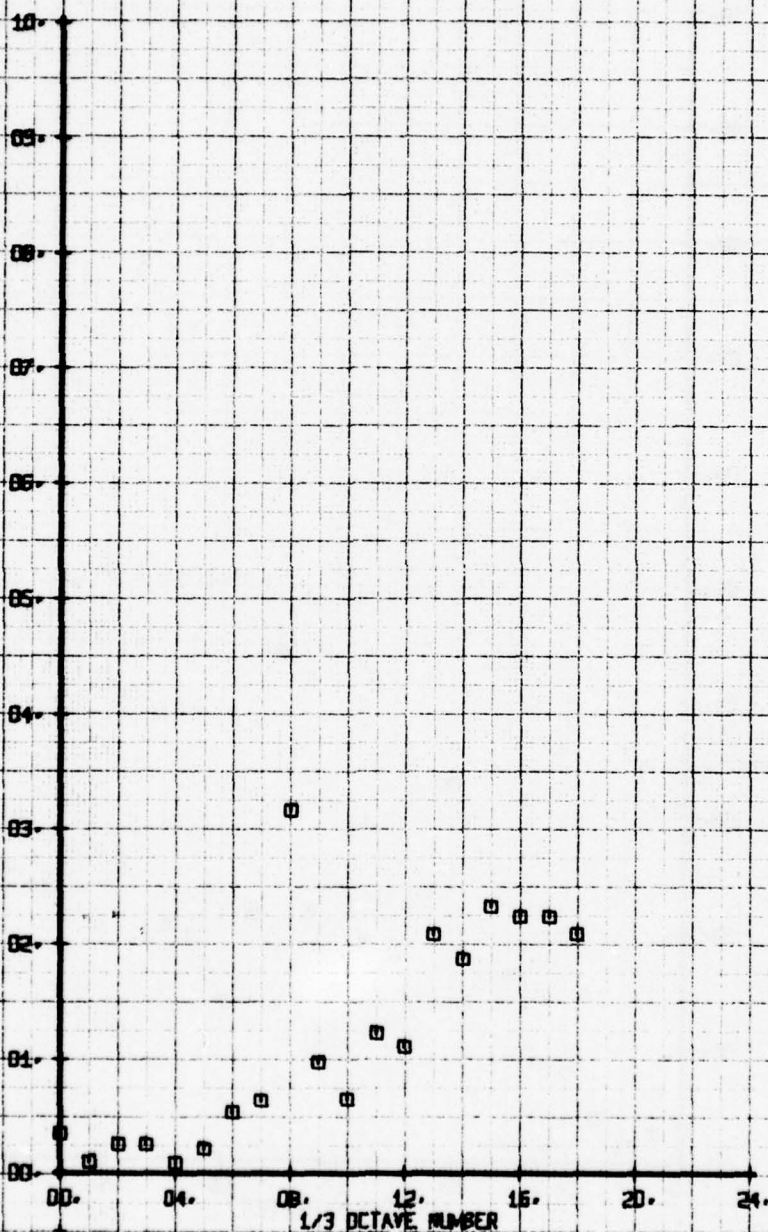


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 TP 7

SYM
 □

LEGEND
 CH 65
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



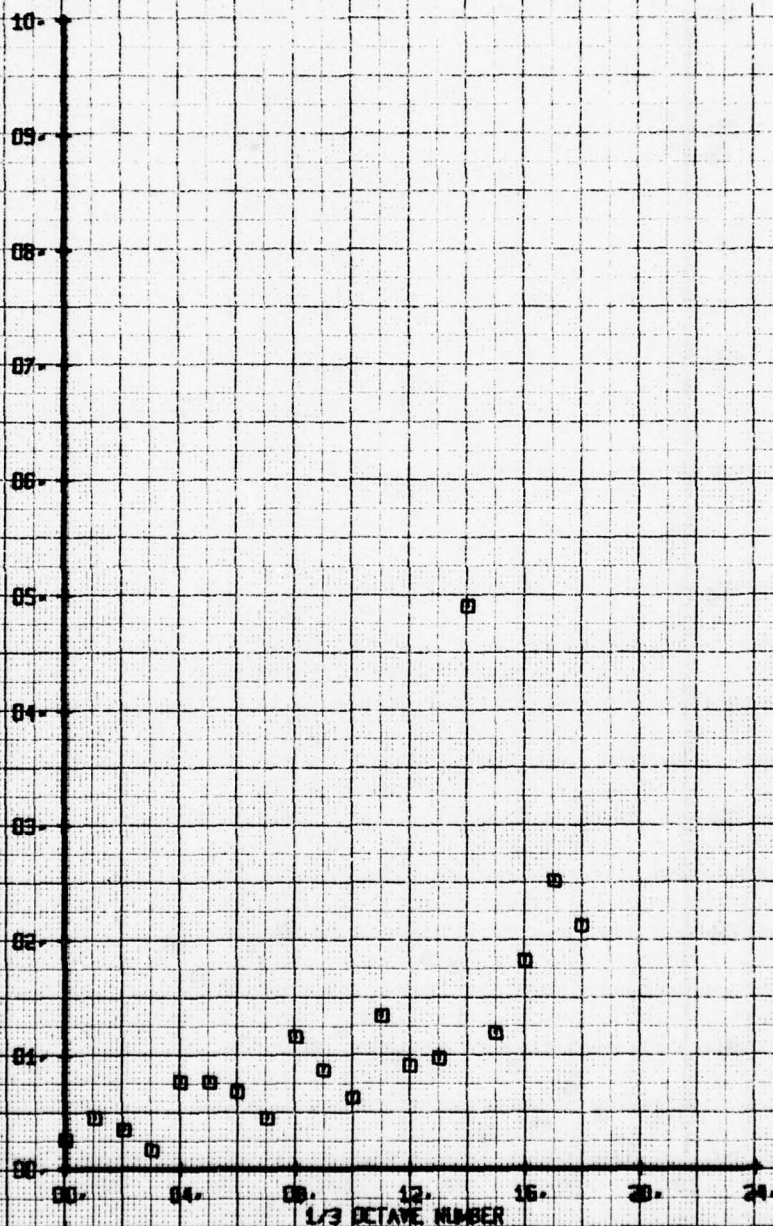
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR - AFT OF SHAFT
 RUN 141 TP B

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

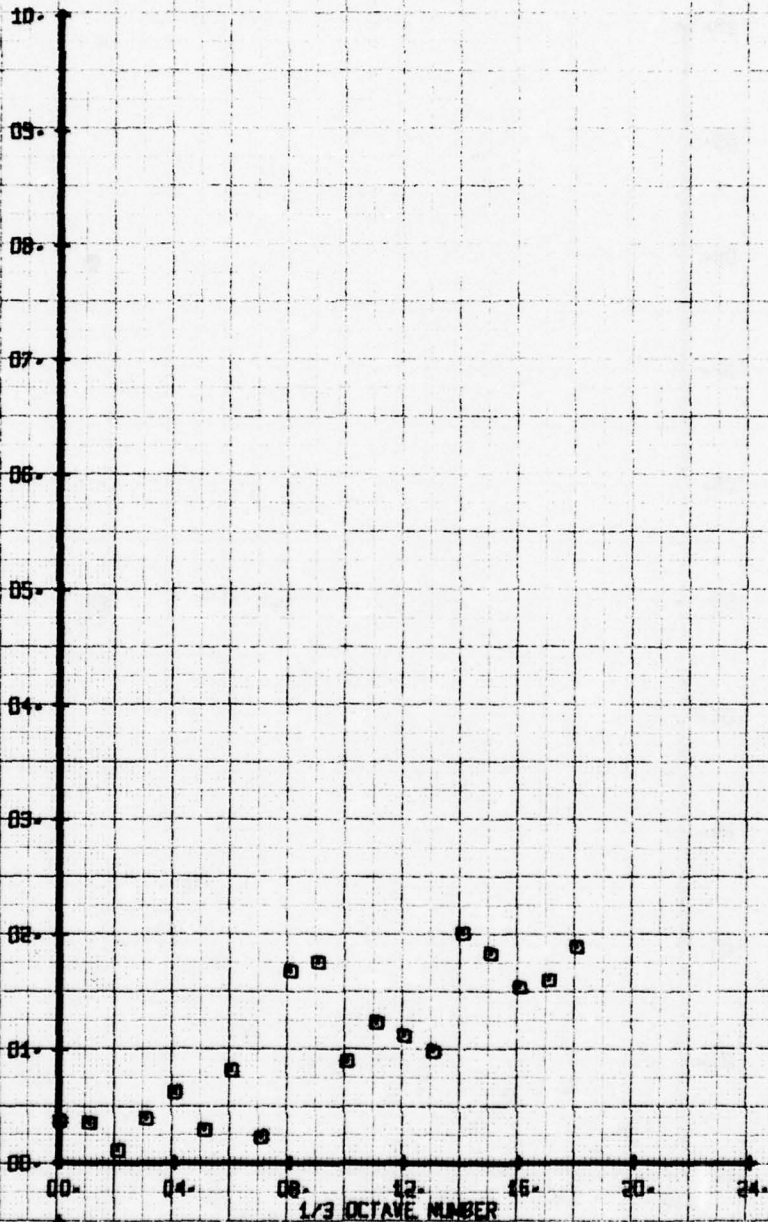
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR - AFT OF SHAFT
 RUN 141 TP 9

LEGEND
 SYM CM PARAMETER
 □ 65 BETA

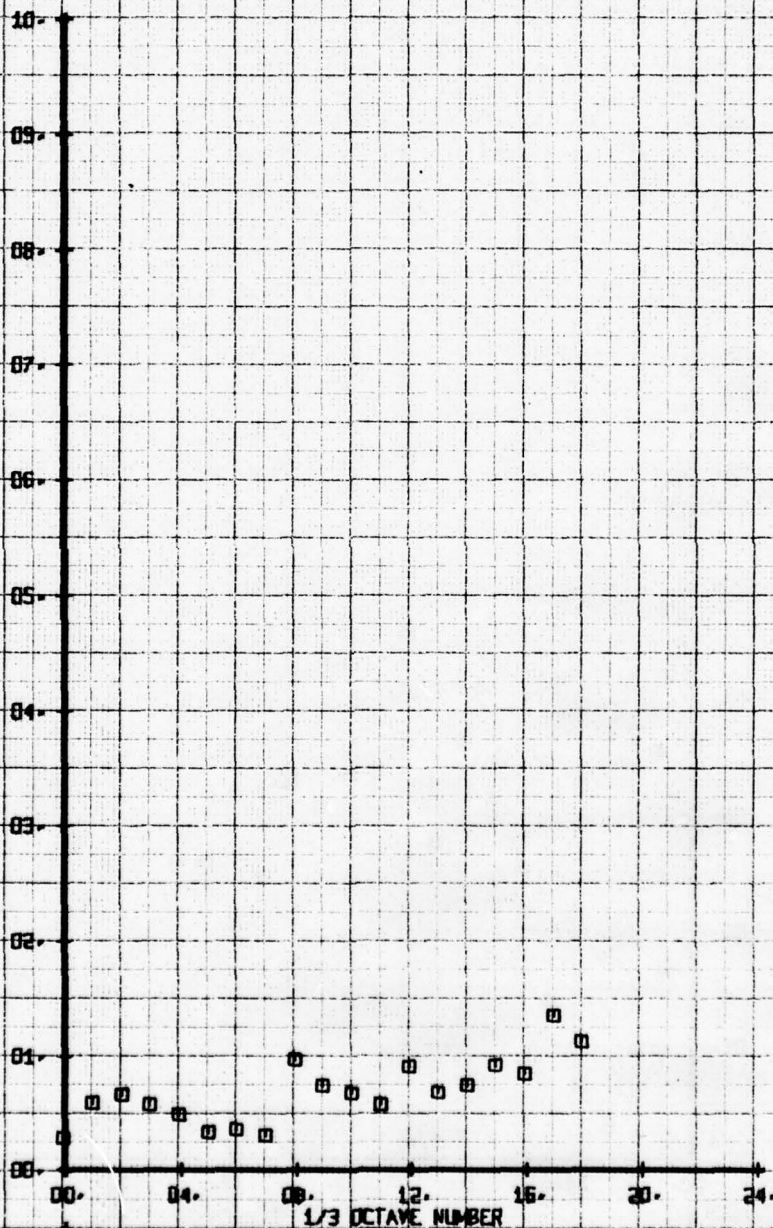
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WIRE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN PAIR - AFT OF SHAFT
 RUN 141 TP 10

SYM	CH	PARAMETER
0	65	BETA

LATERAL FLOW ANGLE, BETA - DEGREES



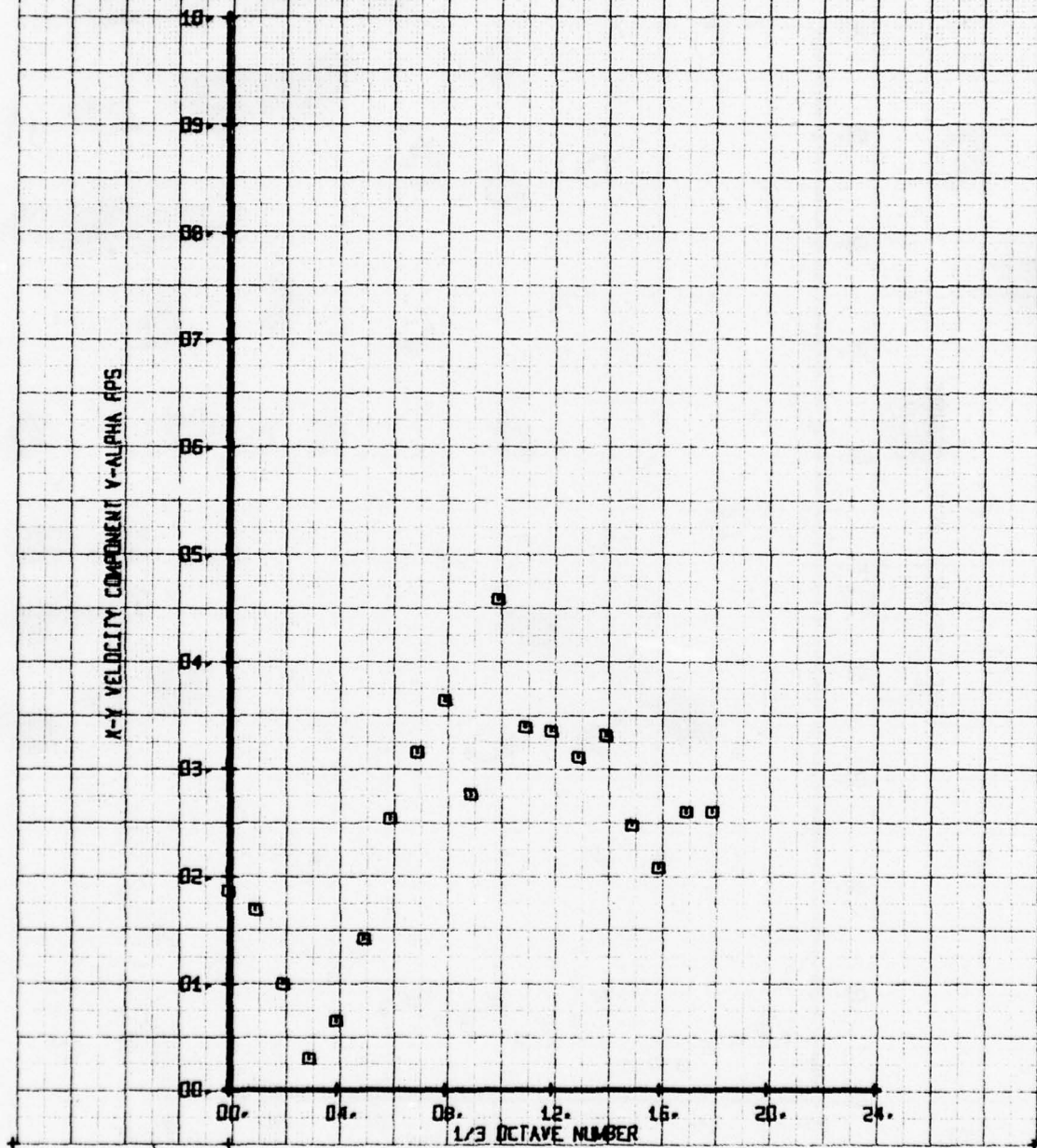
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 IP 2

SYM
 □

CH
 66

LEGEND
 PARAMETER
 Y-ALPHA

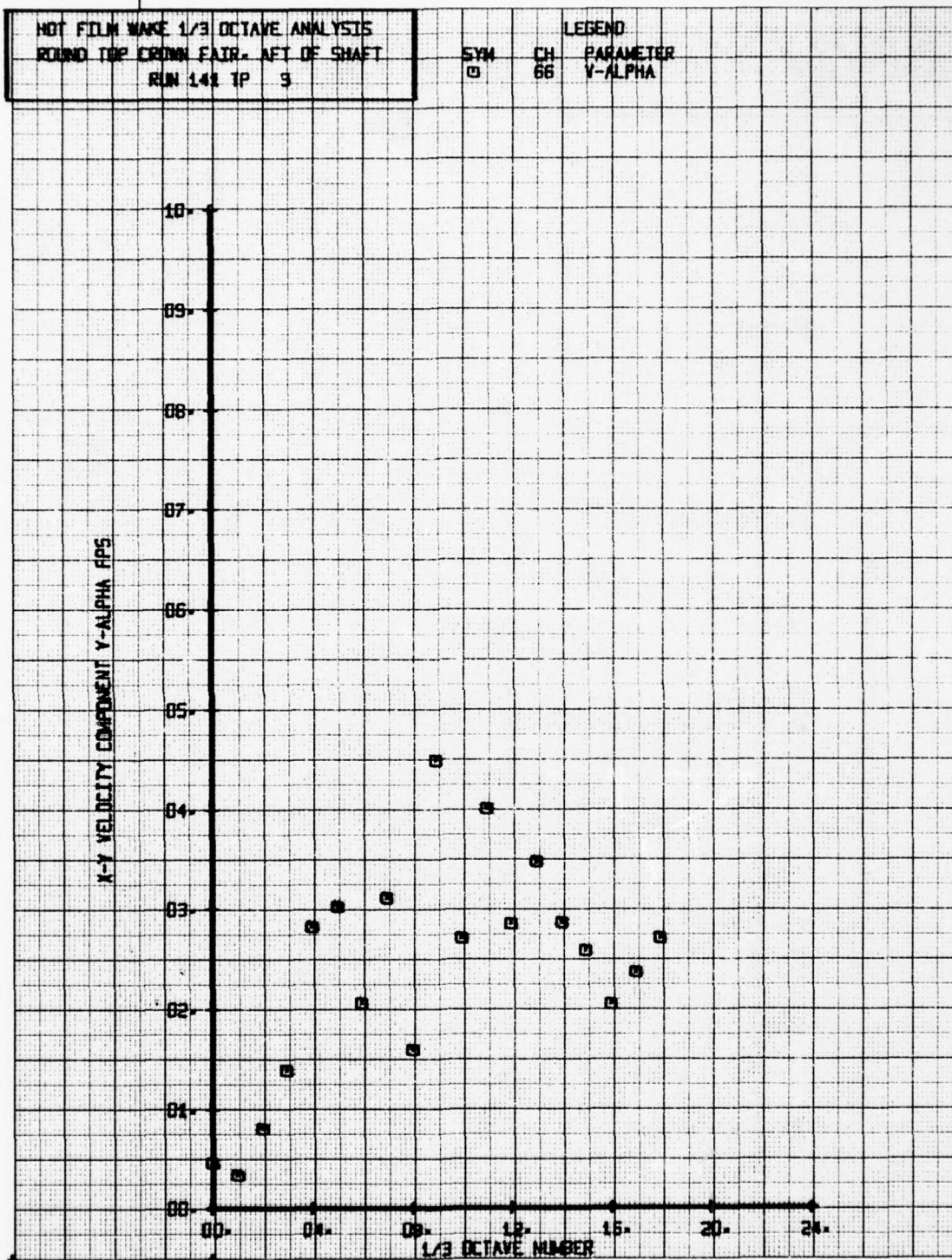
X-Y VELOCITY COMPONENT Y-ALPHA RPS



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHAFT
 RUN 141 TP 3

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

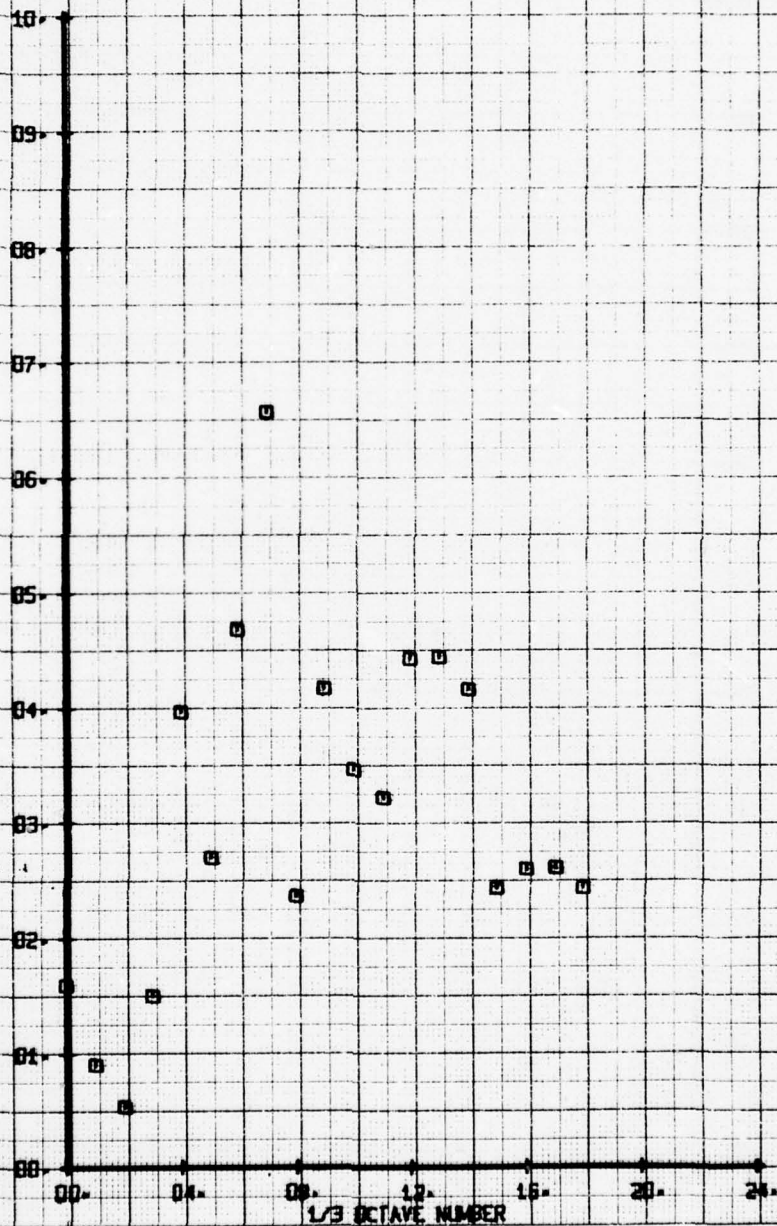
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHAFT
 RUN 141 TP 4

SYM	CH	PARAMETER
□	66	V-ALPHA

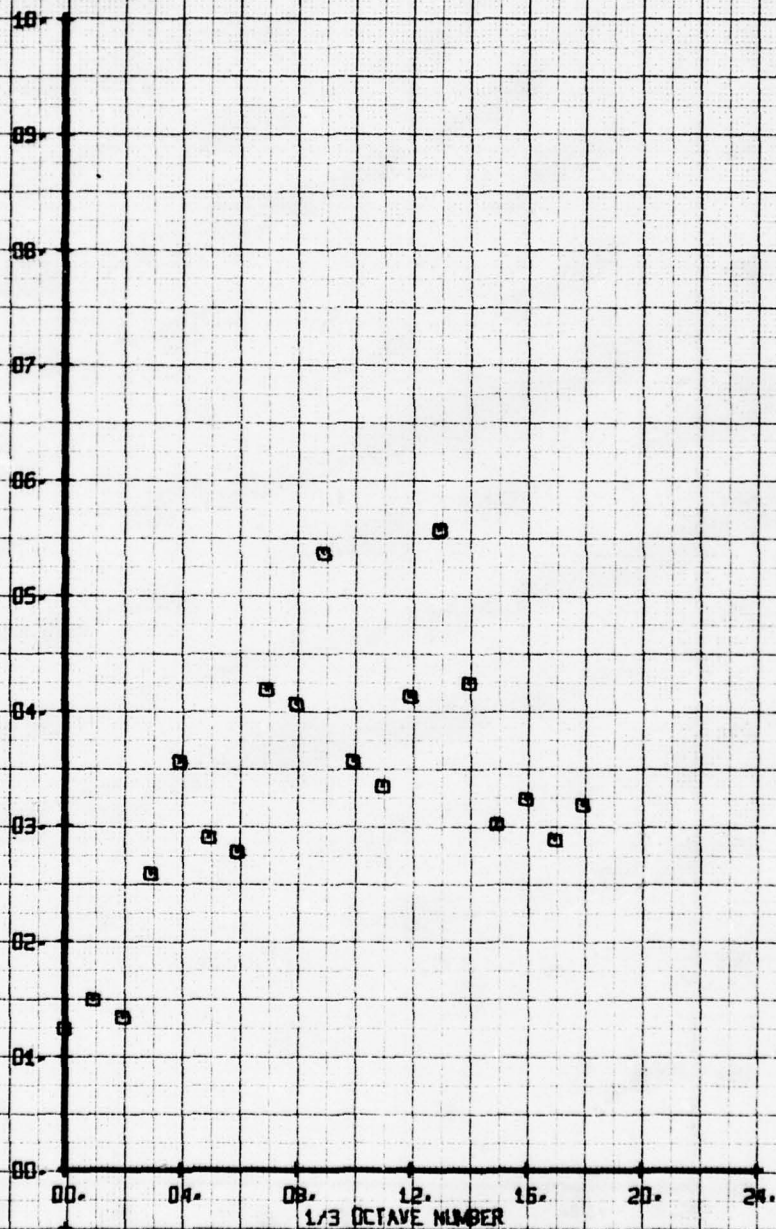
X-Y VELOCITY COMPONENT V-ALPHA FPS



NET FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 TP 5

SYN CH PARAMETER
 0 55 V-ALPHA

K-Y VELOCITY COMPONENT V-ALPHA FPS



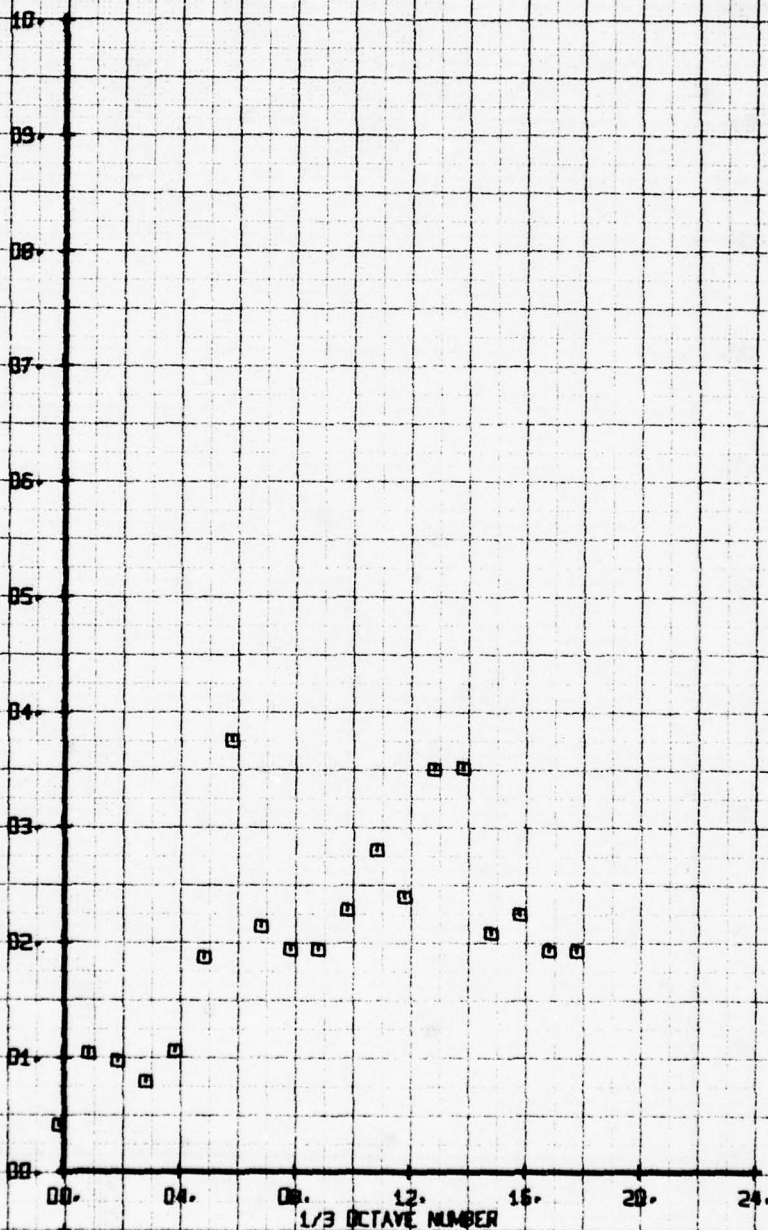
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 TP 6

SYM
 @

CH
 66

LEGEND
 PARAMETER
 Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA FPS



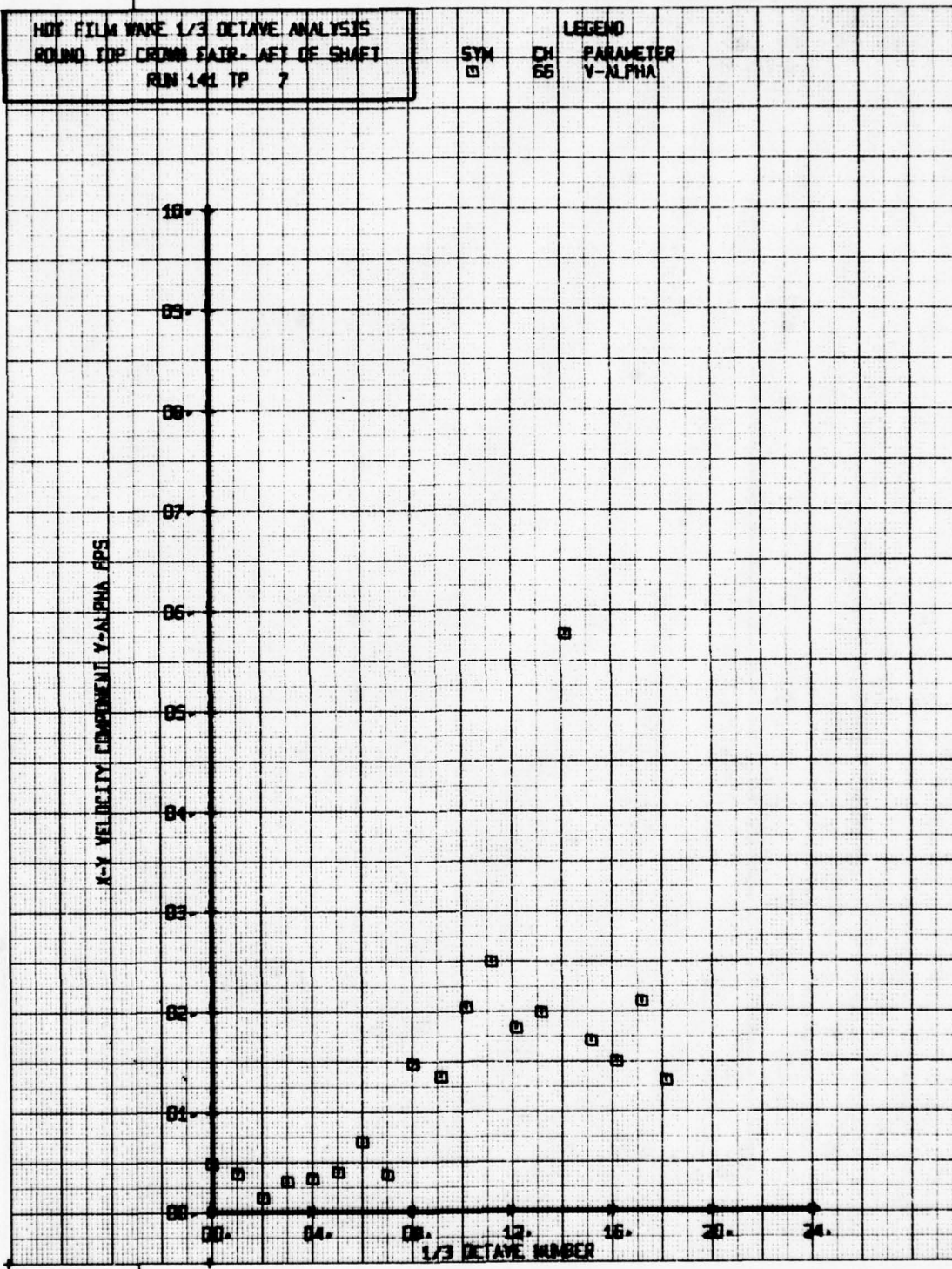
HOY FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHAFT
 RUN 141 TP 7

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

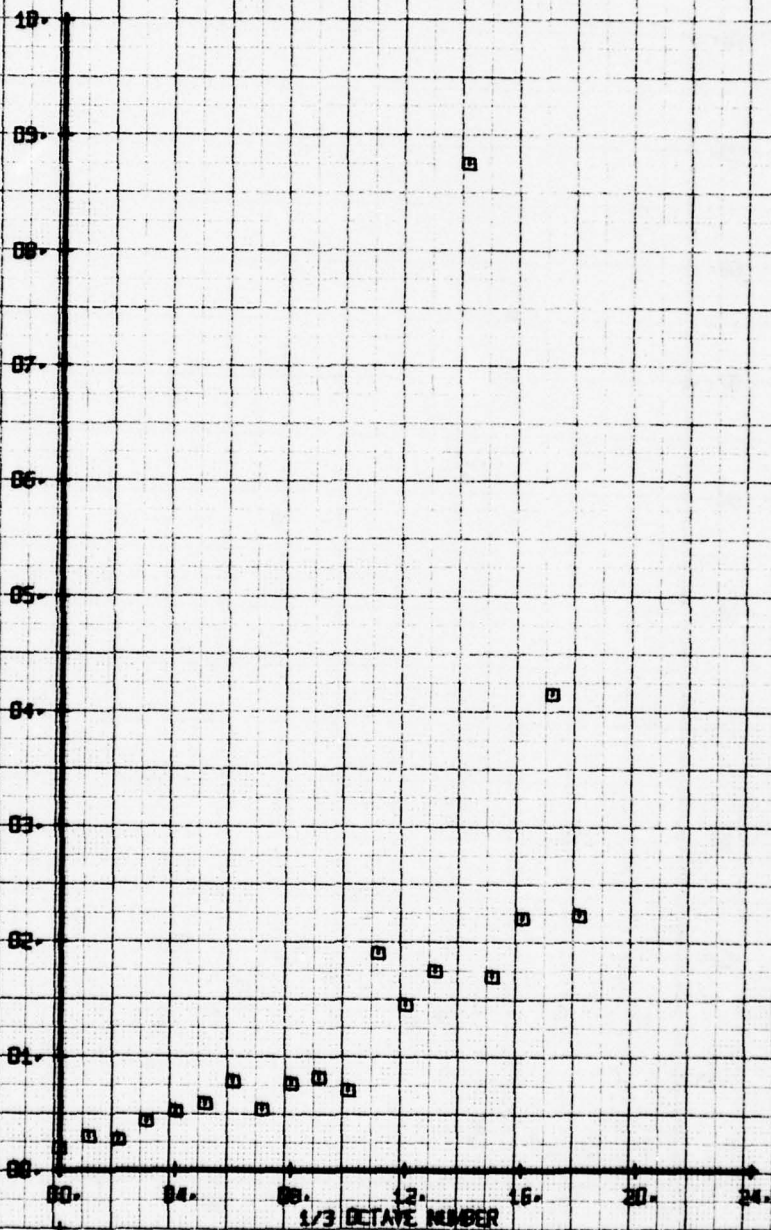
V-ALPHA VELOCITY COMPONENT V-ALPHA EPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHAFT
 RUN 141 TP 8

SYM	CH	PARAMETER
□	68	V-ALPHA

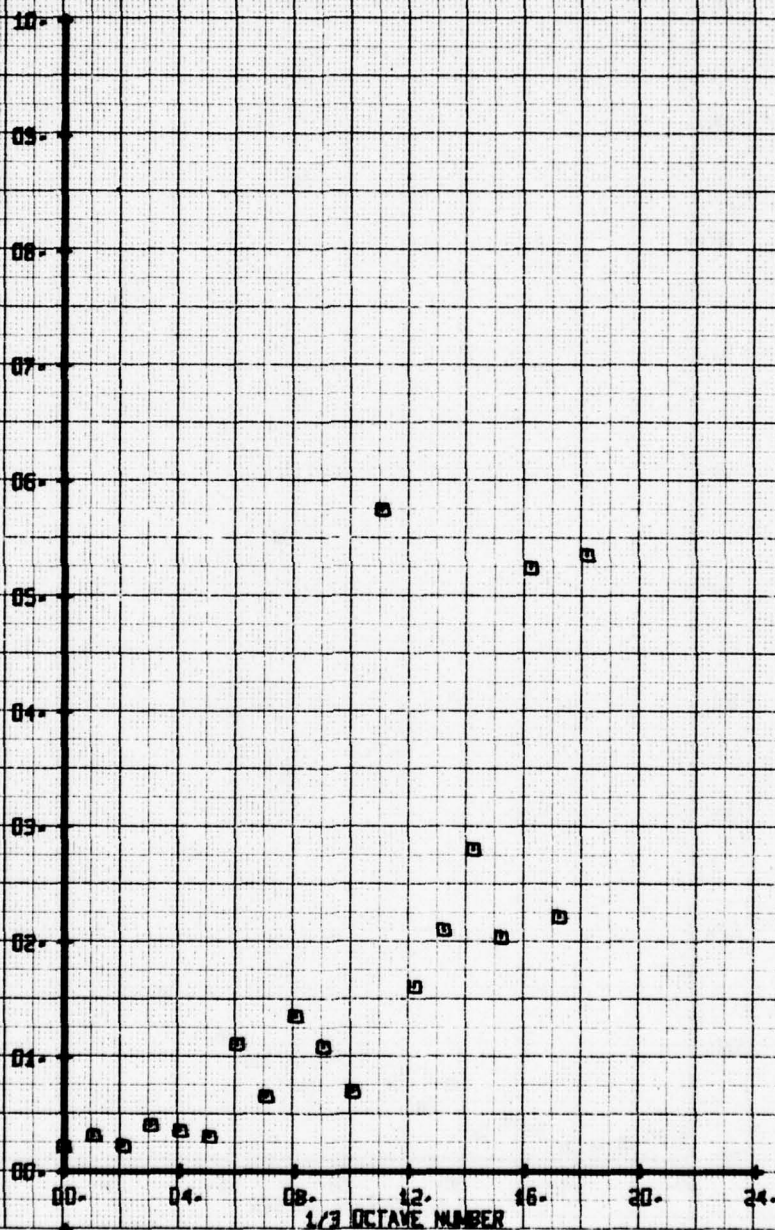
X-Y VELOCITY COMPONENT V-ALPHA FPS



NOI FILM WAVE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR- AFT OF SHaft
 RUN 141 TP 3

LEGEND
 CHN 66
 PARAMETER
 V-ALPHA

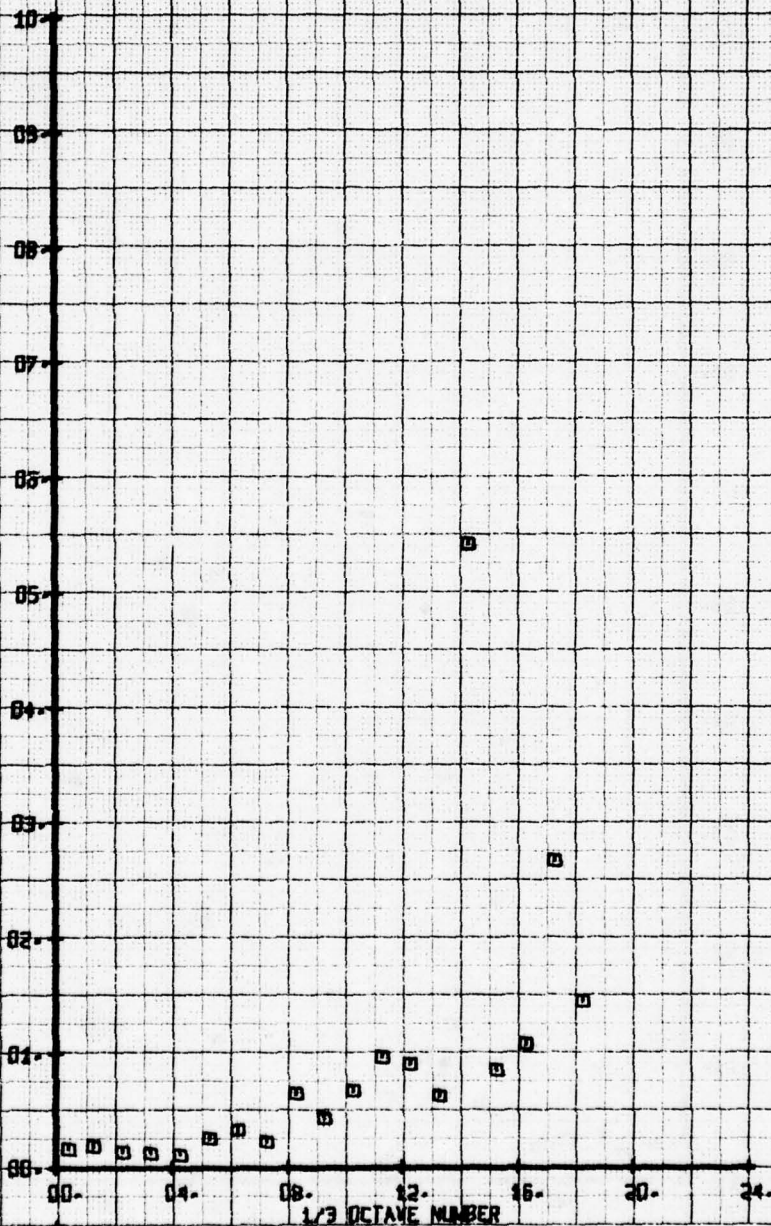
X-Y VELOCITY COMPONENT V-ALPHA EPS

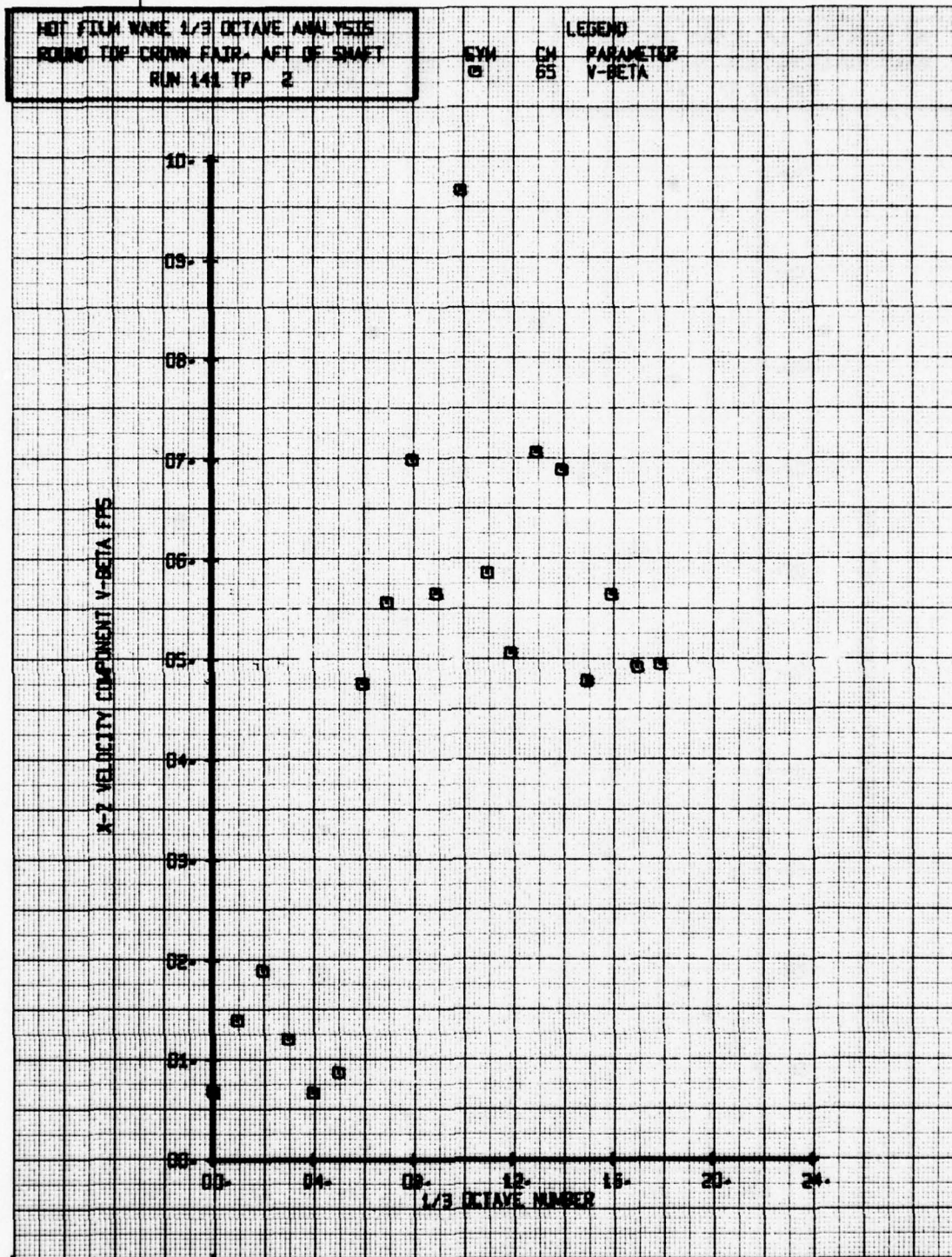


NOT FILM WARE 1/3 OCTAVE ANALYSIS
 ROUND THE CROWN FAULT. AFT OF SHAFT
 RUN 141 TP 1D

SYN CH PARAMETER
 01 66 V-ALPHA

V-ALPHA COMPONENT V-ALPHA FPS





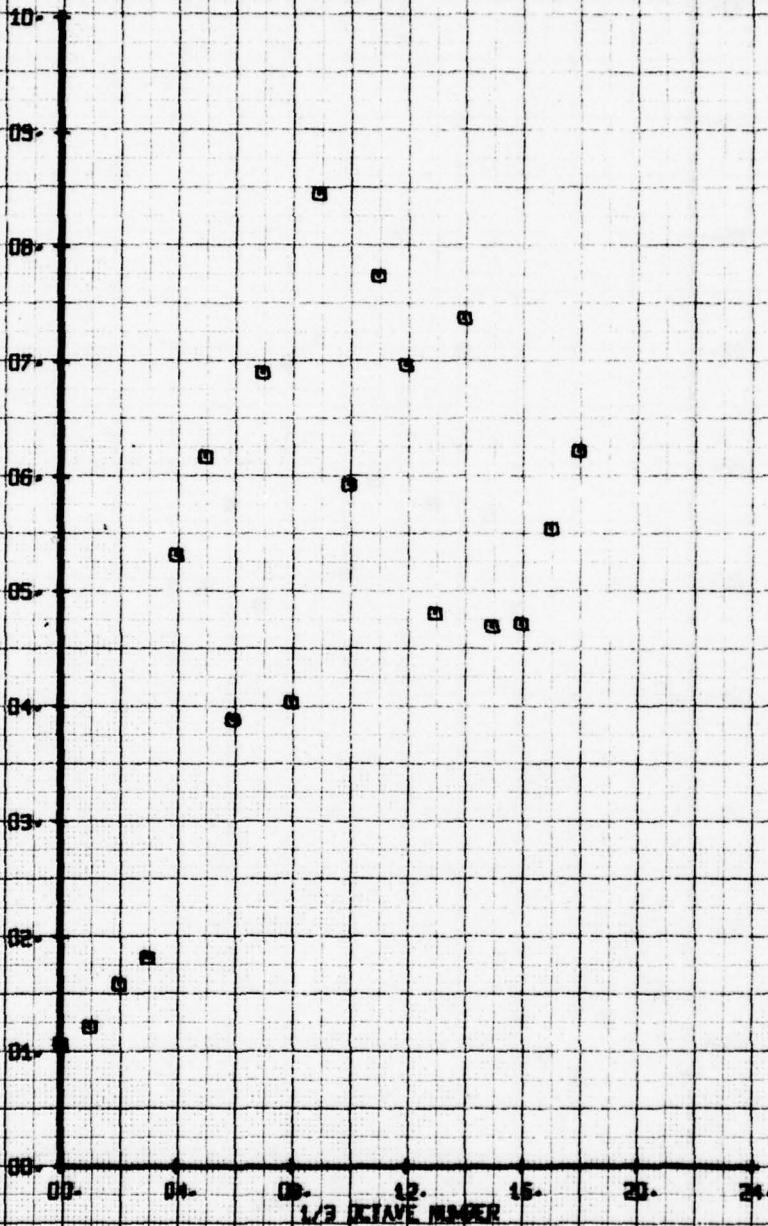
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR, AFT OF SHAFT
 RUN 141 TP 3

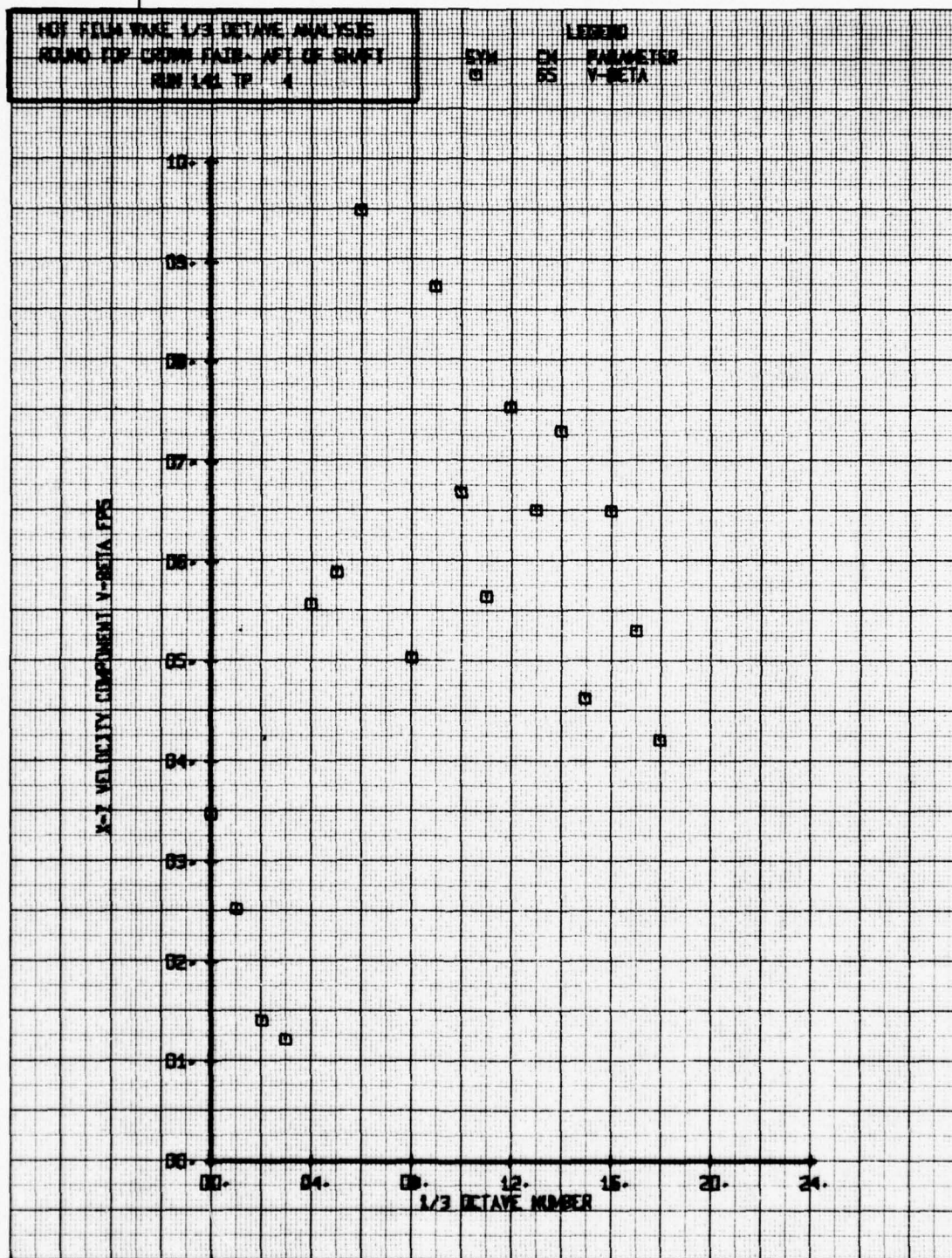
SYM
 □

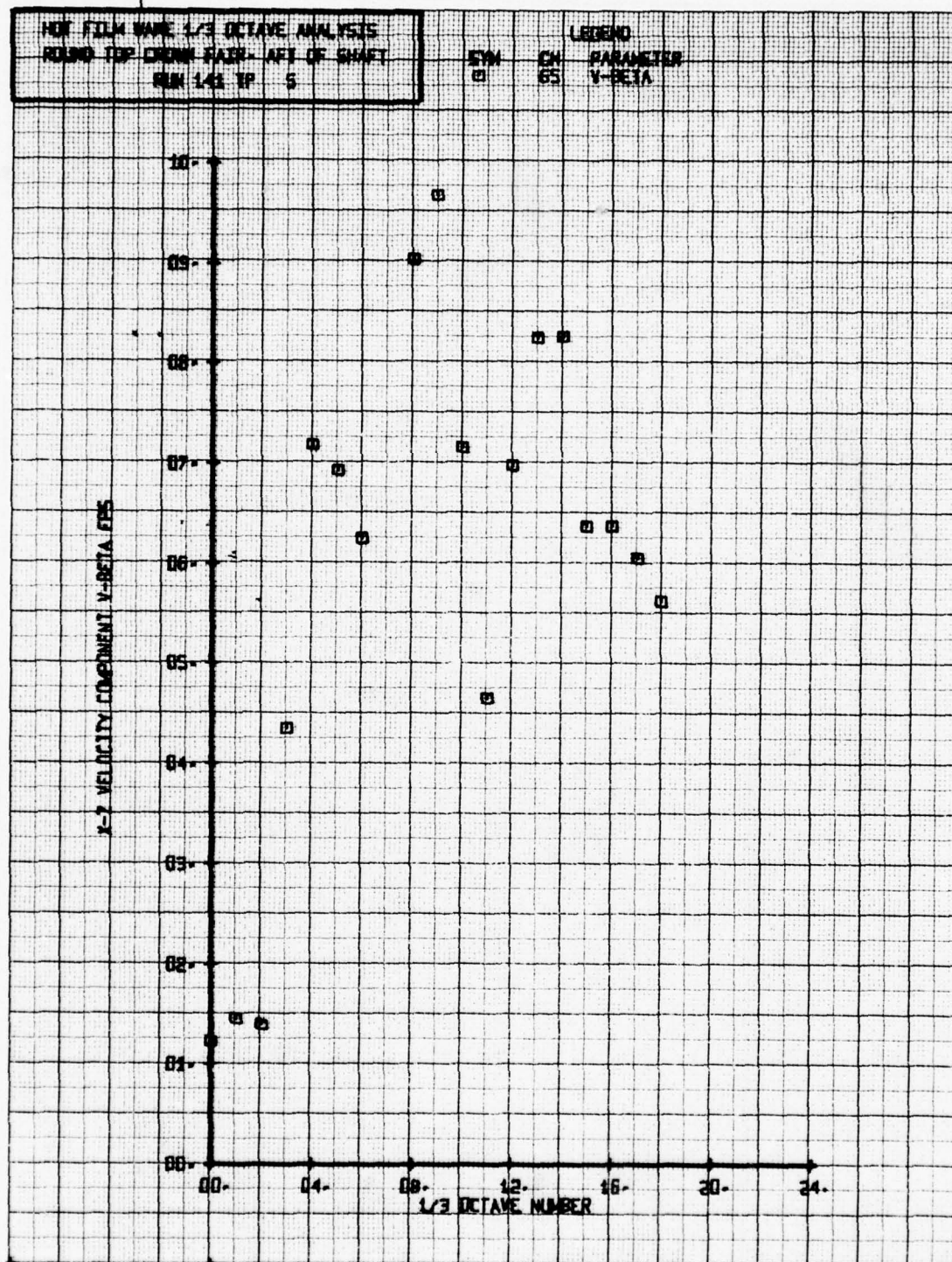
CH
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS







NET FILM WAVE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN PAIR- AFT OF SHAFT
 RUN 141 TP. 6

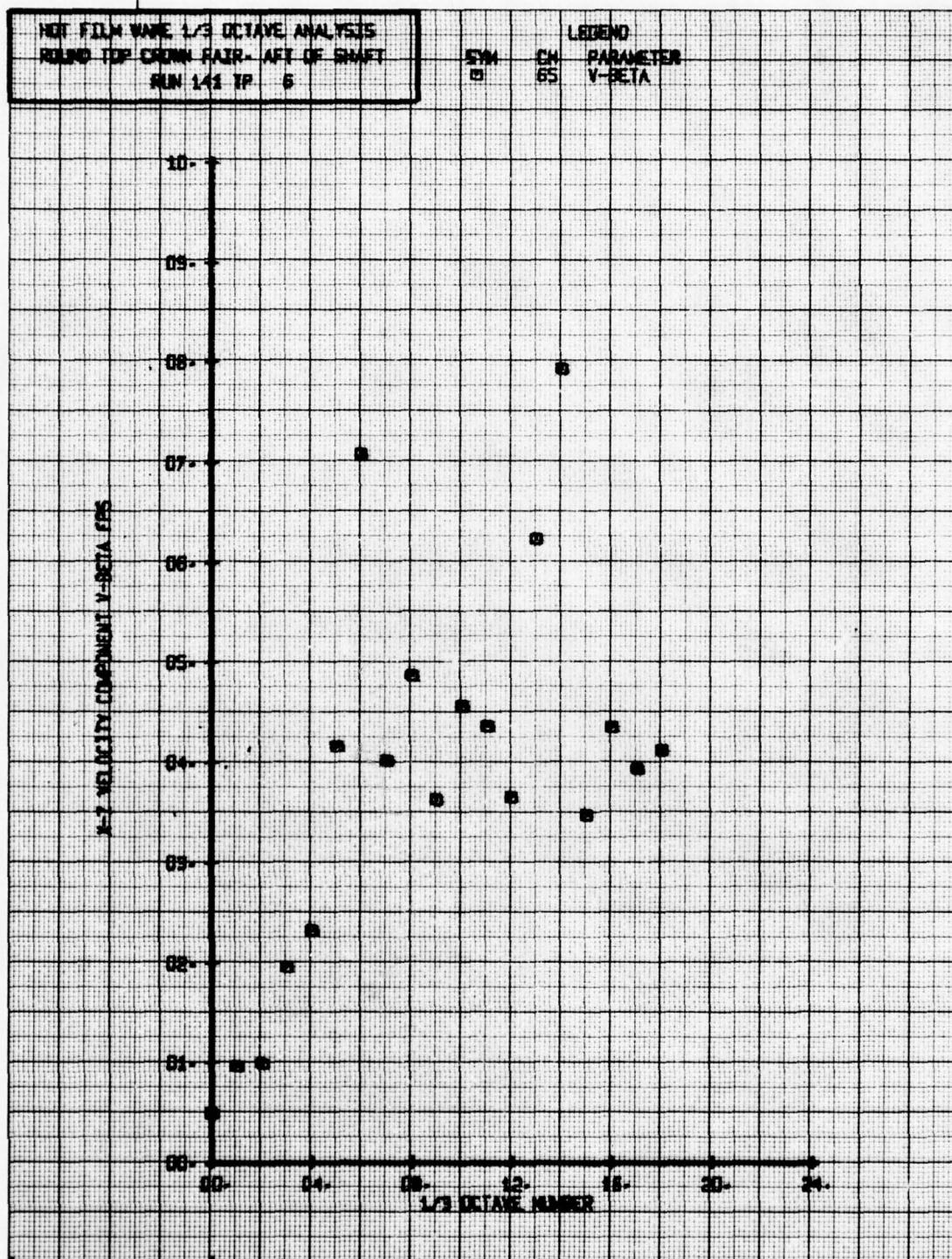
SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

V-2 VELOCITY COMPONENT V-BETA FPS

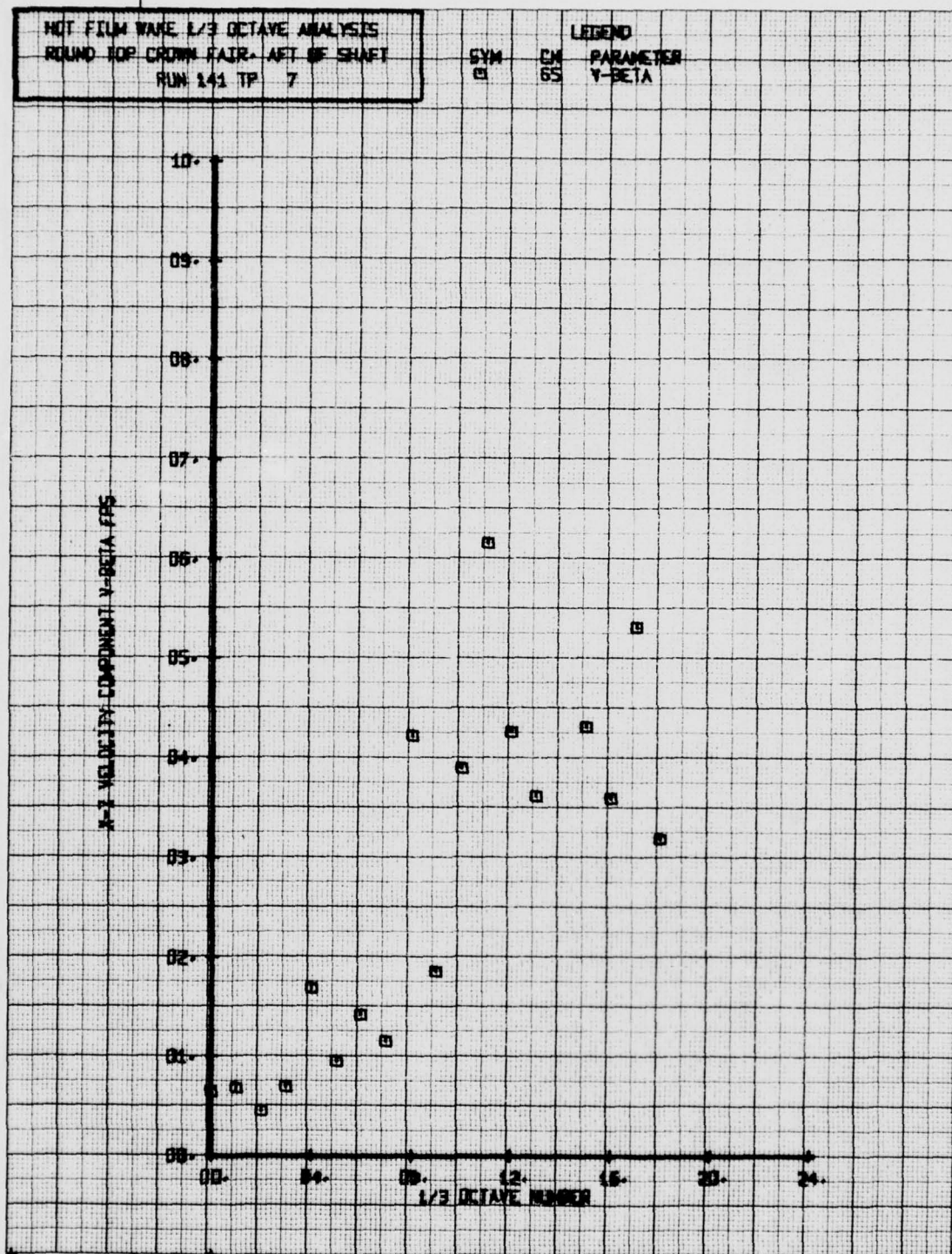
1/3 OCTAVE NUMBER

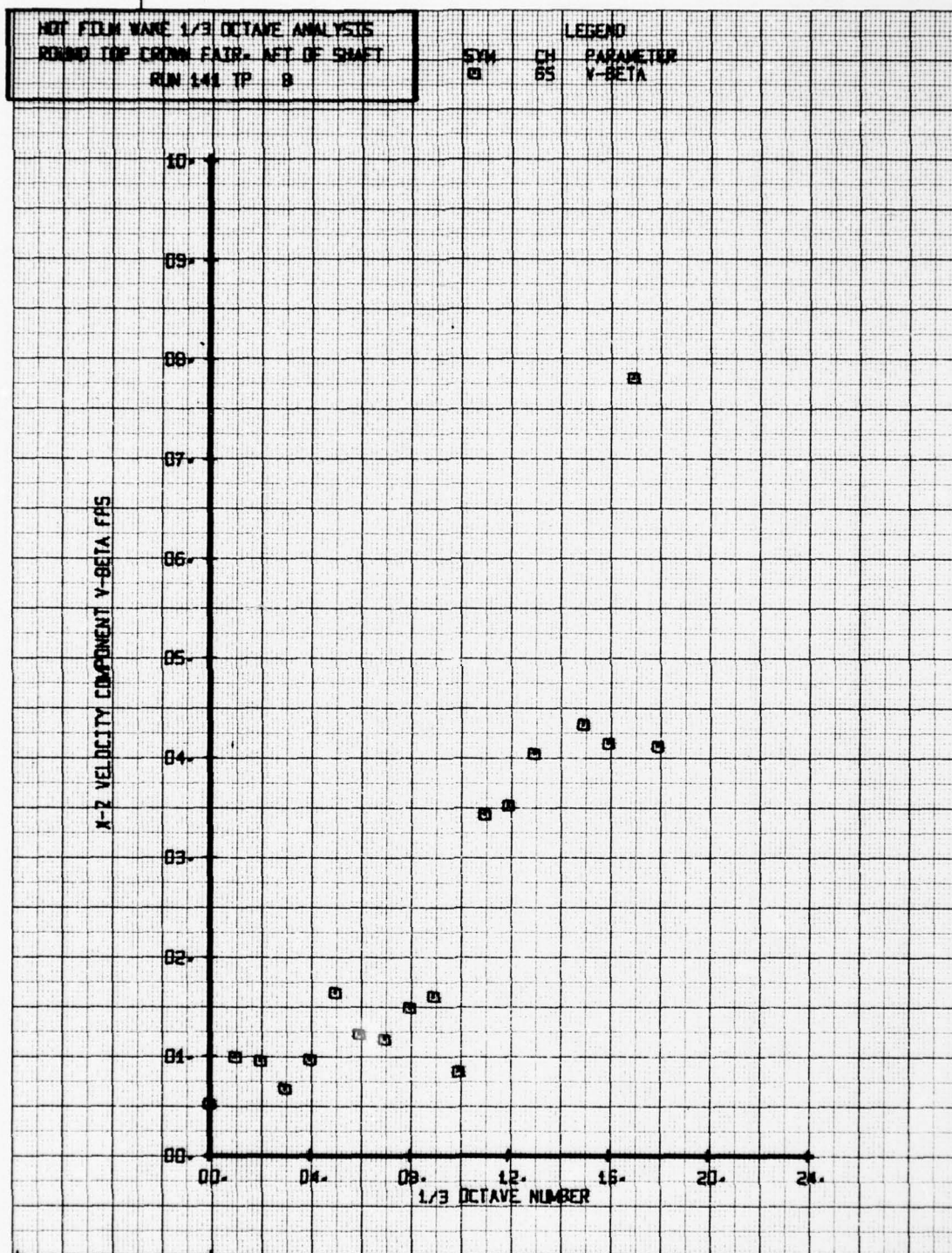


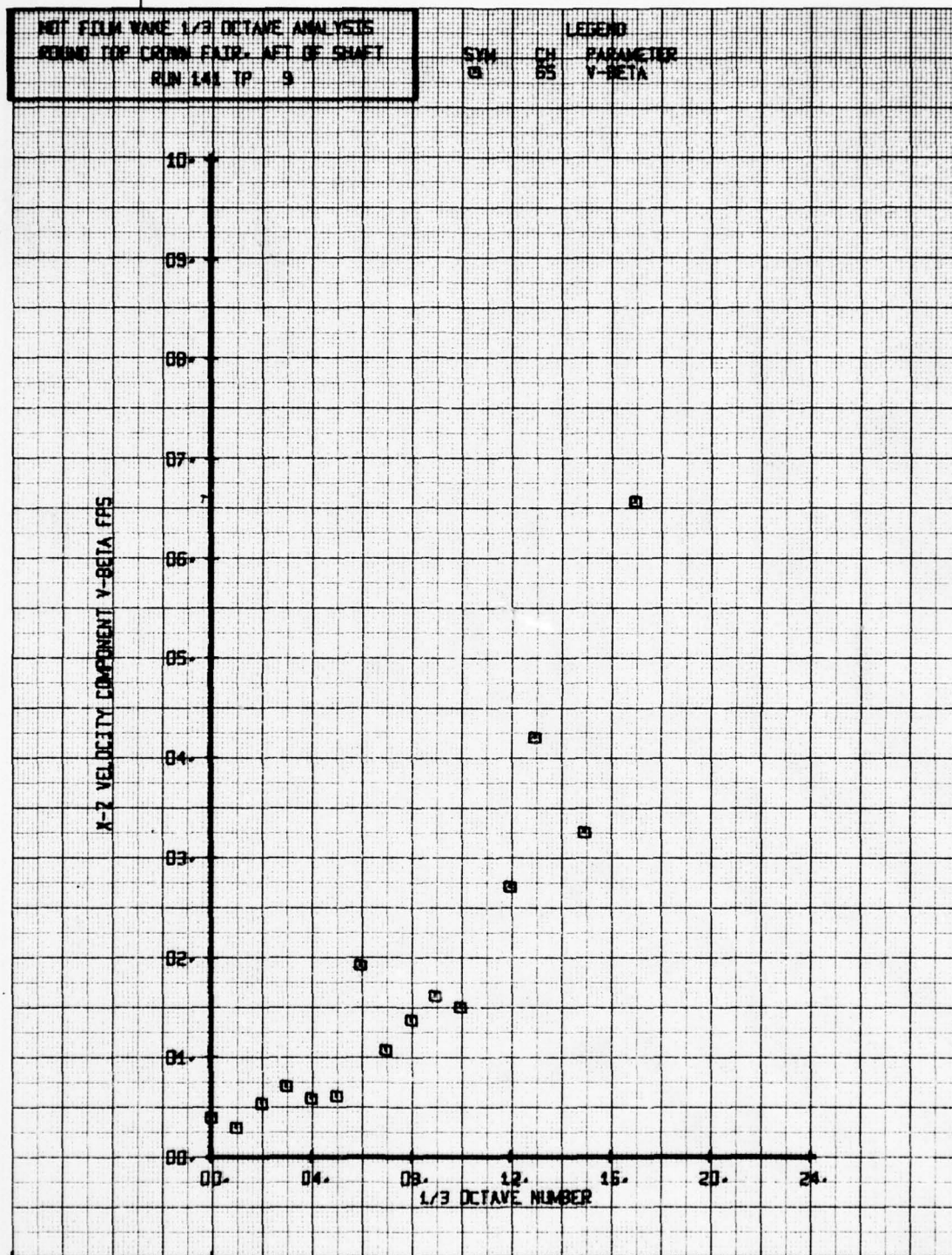
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR-AFT OF SHAFT
 RUN 141 TP 7

LEGEND
 SYM CM PARAMETER
 □ 65 Y-BETA

X-Y VELOCITY COMPONENT Y-BETA FPS

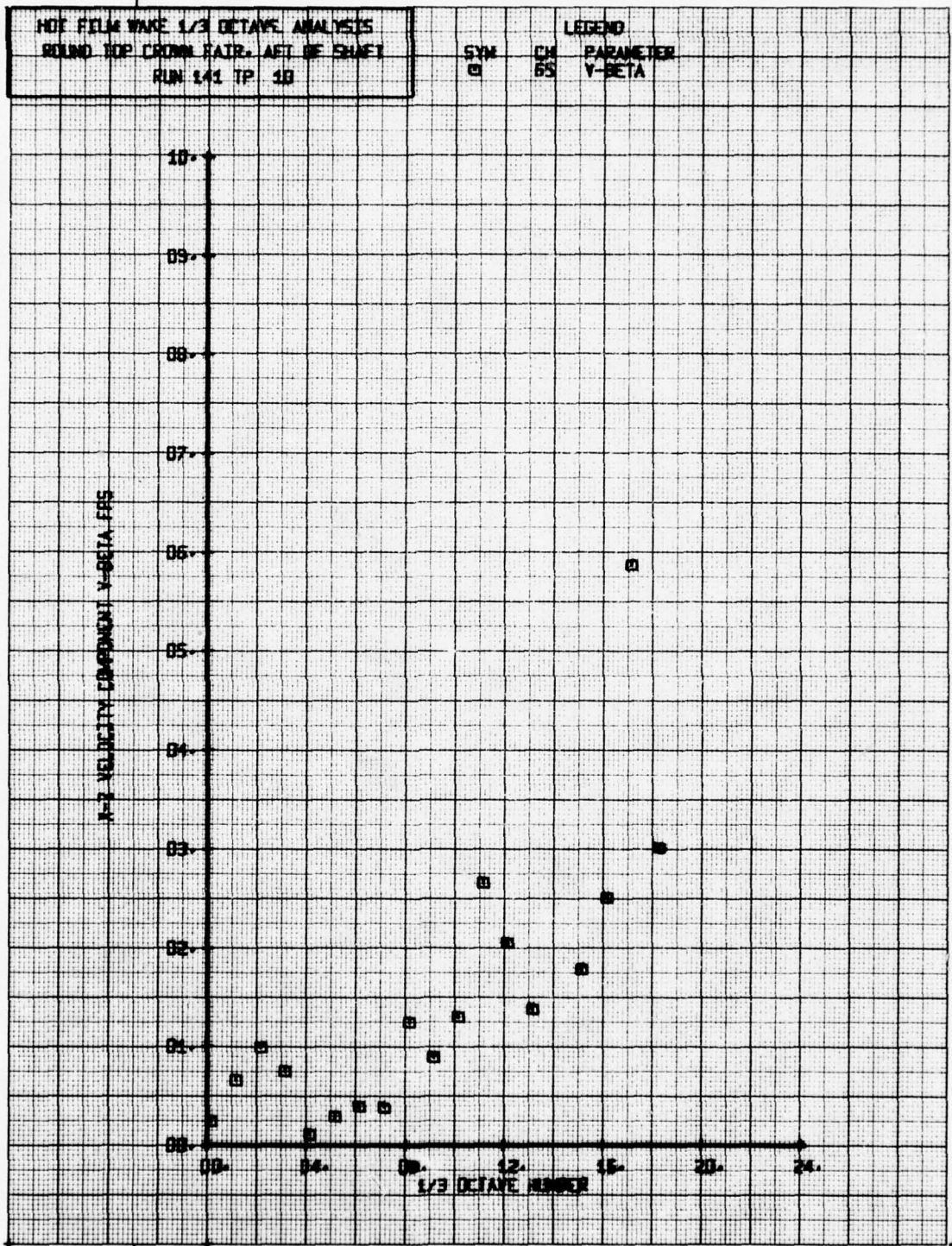






HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 ROUND TOP CROWN FAIR. AFT OF SHAFT
 RUN 141 TP 10

LEGEND
 CH 65
 PARAMETER
 Y-BETA
 SYM
 □

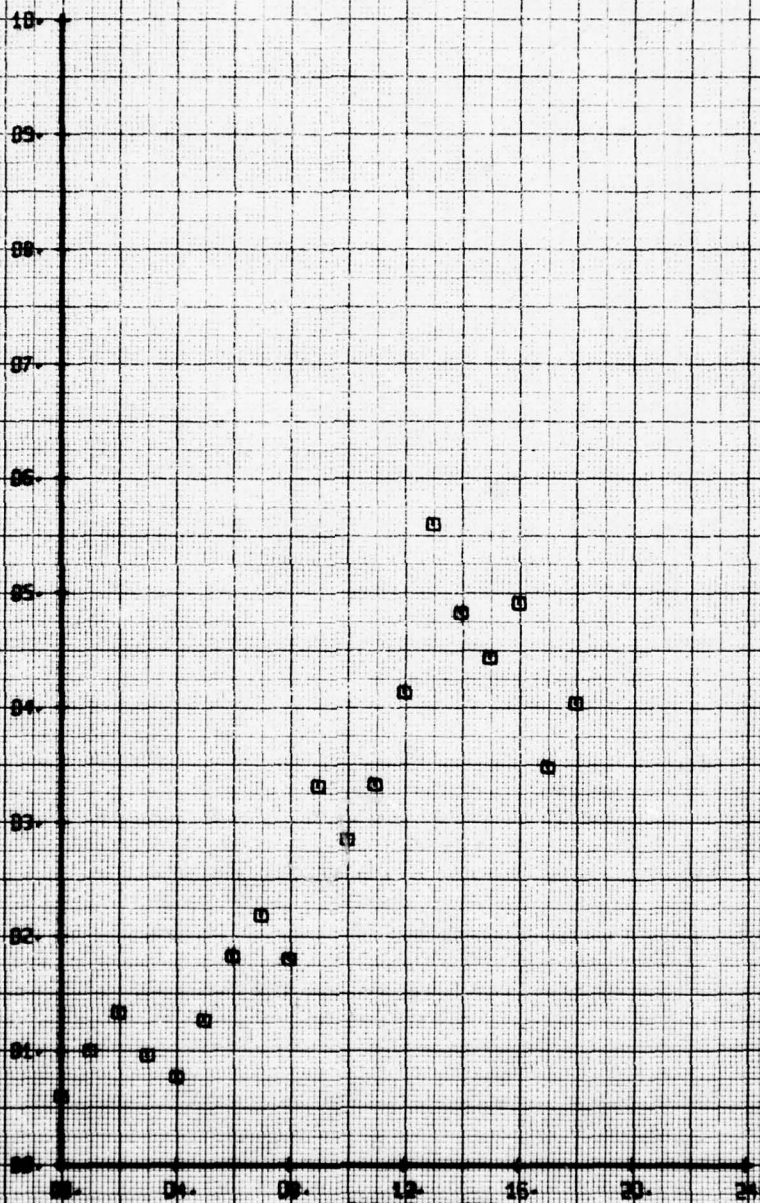


NOY FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 2

SYN CH
 0 56
 LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

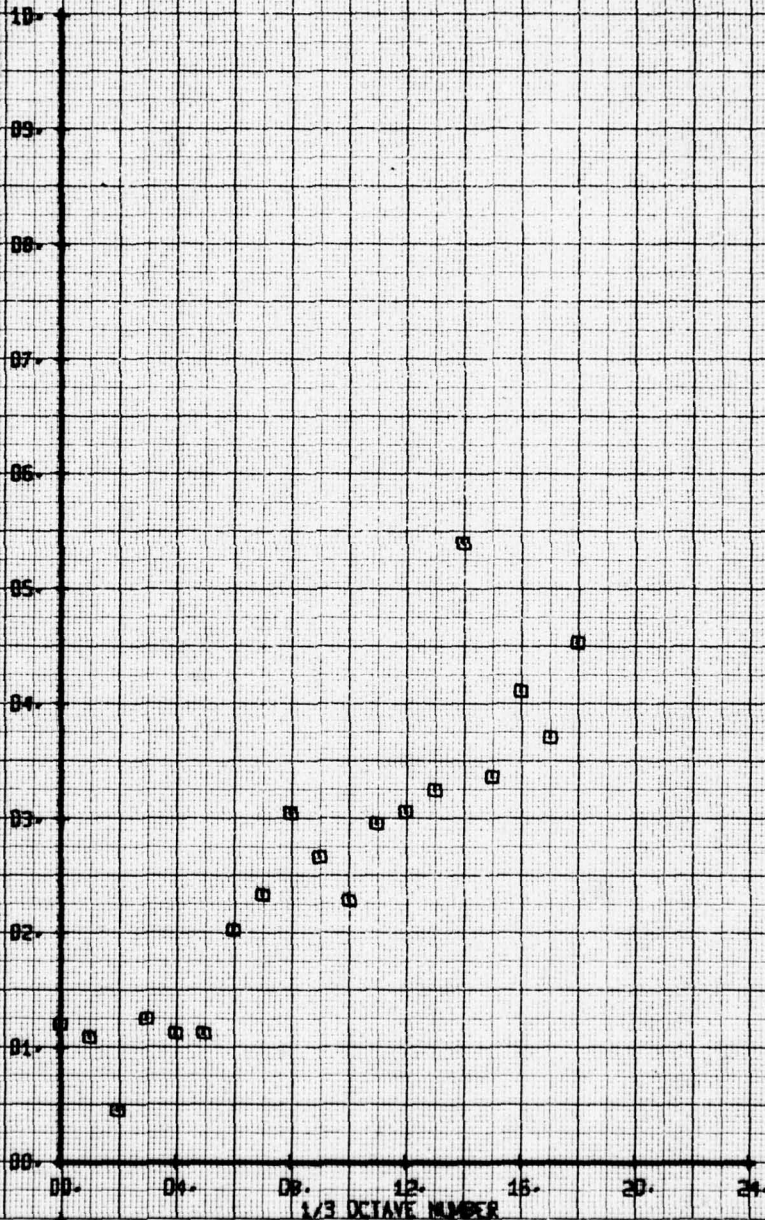
1/3 OCTAVE NUMBER



NOY FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN EXTREME
 RUN 170 TP 3

SYM ON
 0 66
 LEGEND
 PARAMETER
 ALPHA

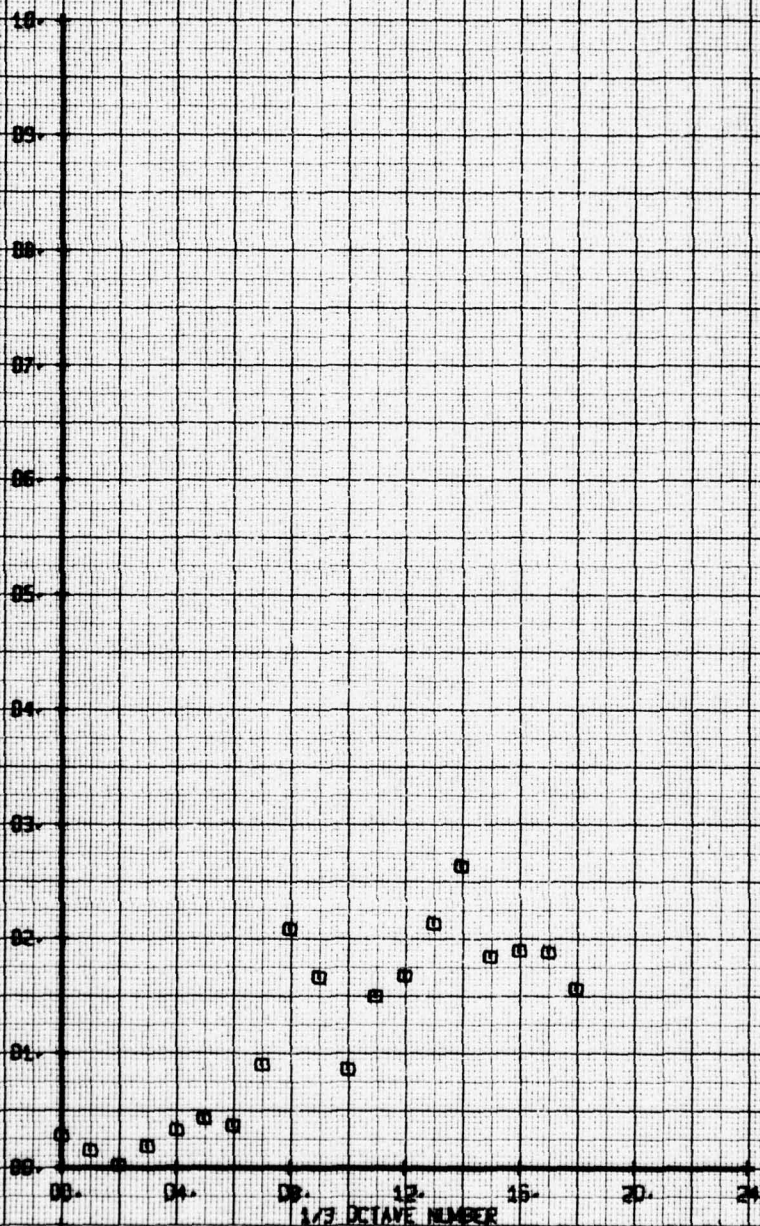
VERTICAL FLOW ANGLE, ALPHA - DEGREES



NOI FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CREWM FATHING
 RUN 170 TP 4

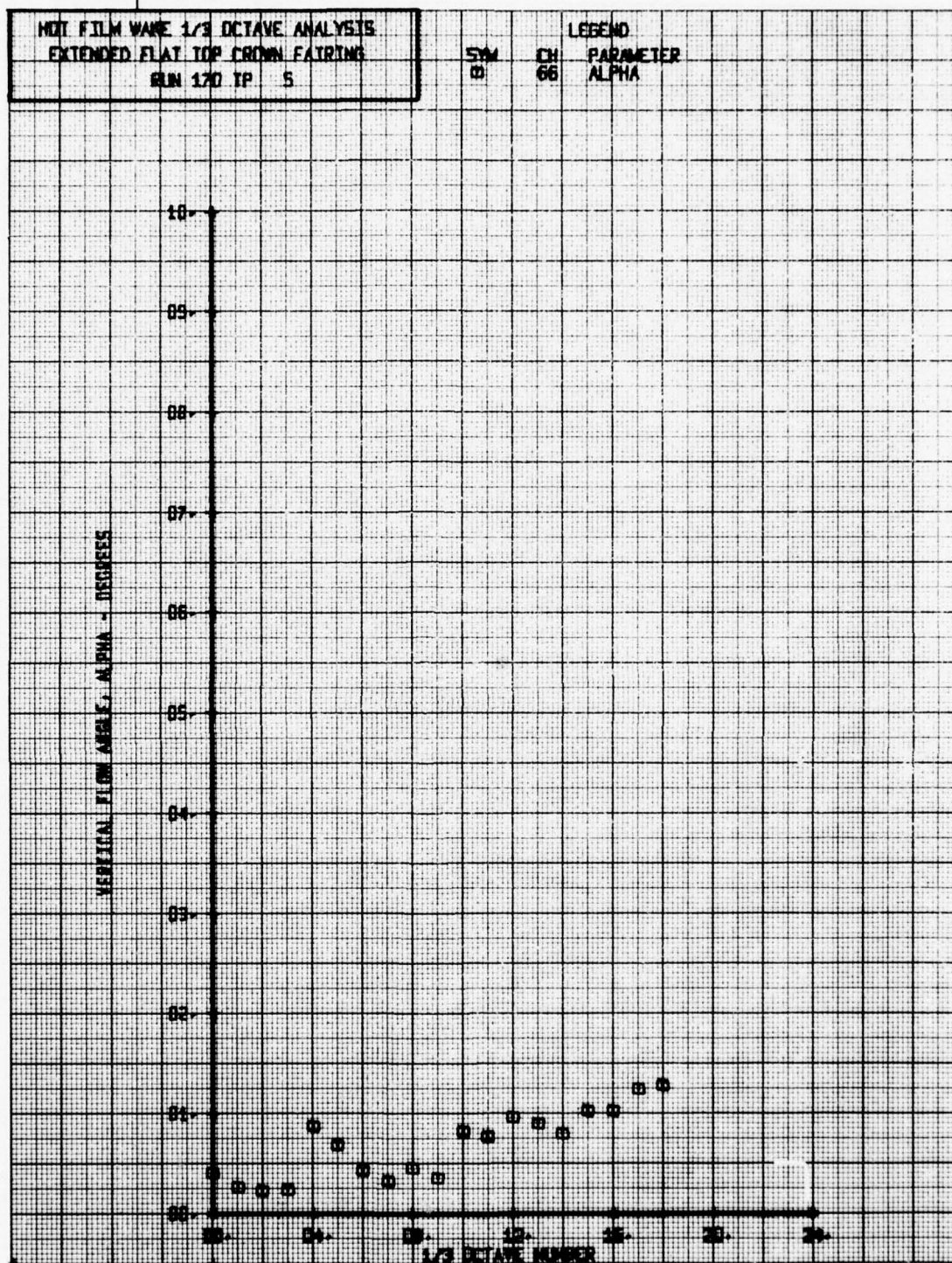
LEGEND
 SW CH PARAMETER
 05 06 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



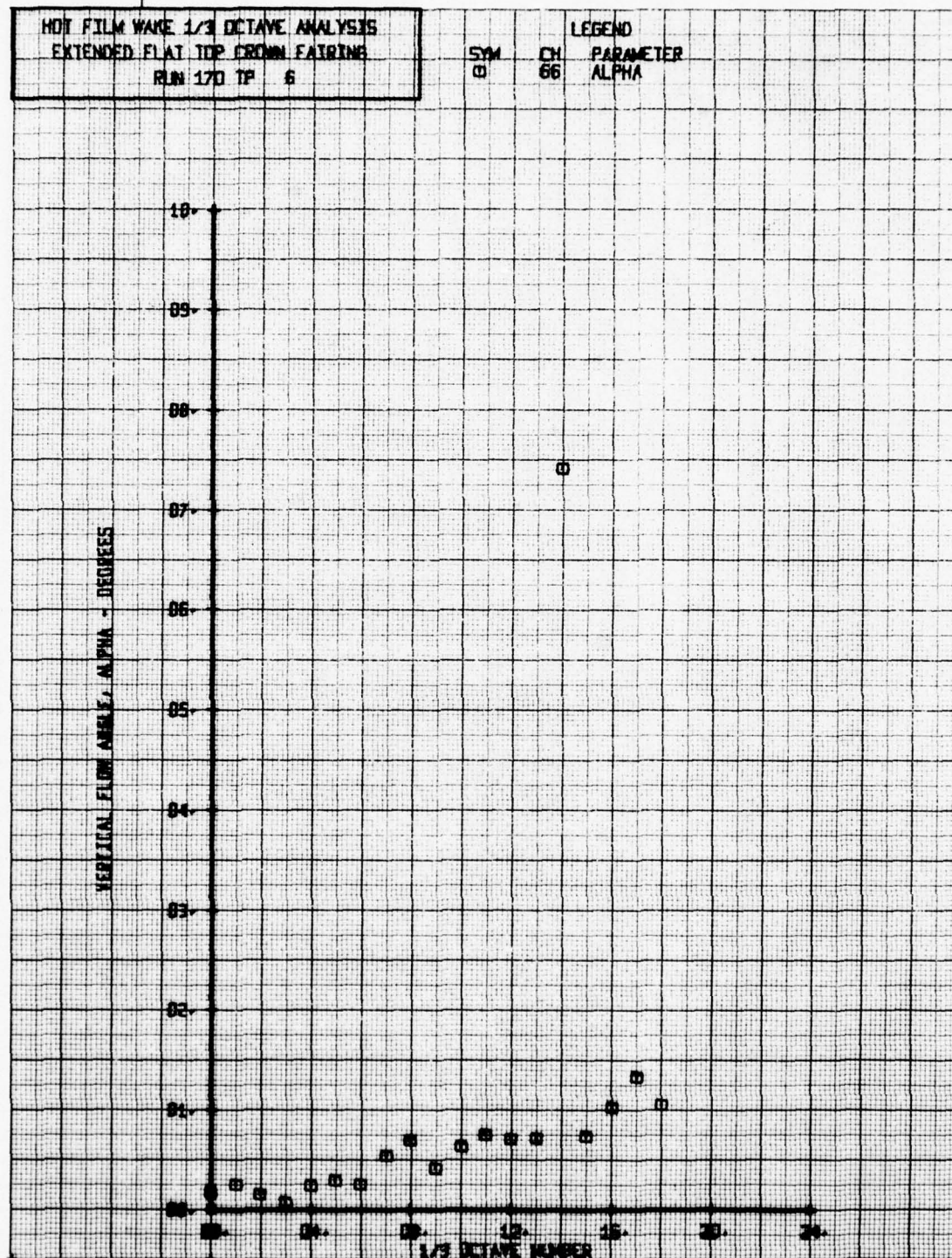
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 IP 5

SWM CH PARAMETER
 00 66 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 6

SYN CH PARAMETER
 0 66 ALPHA

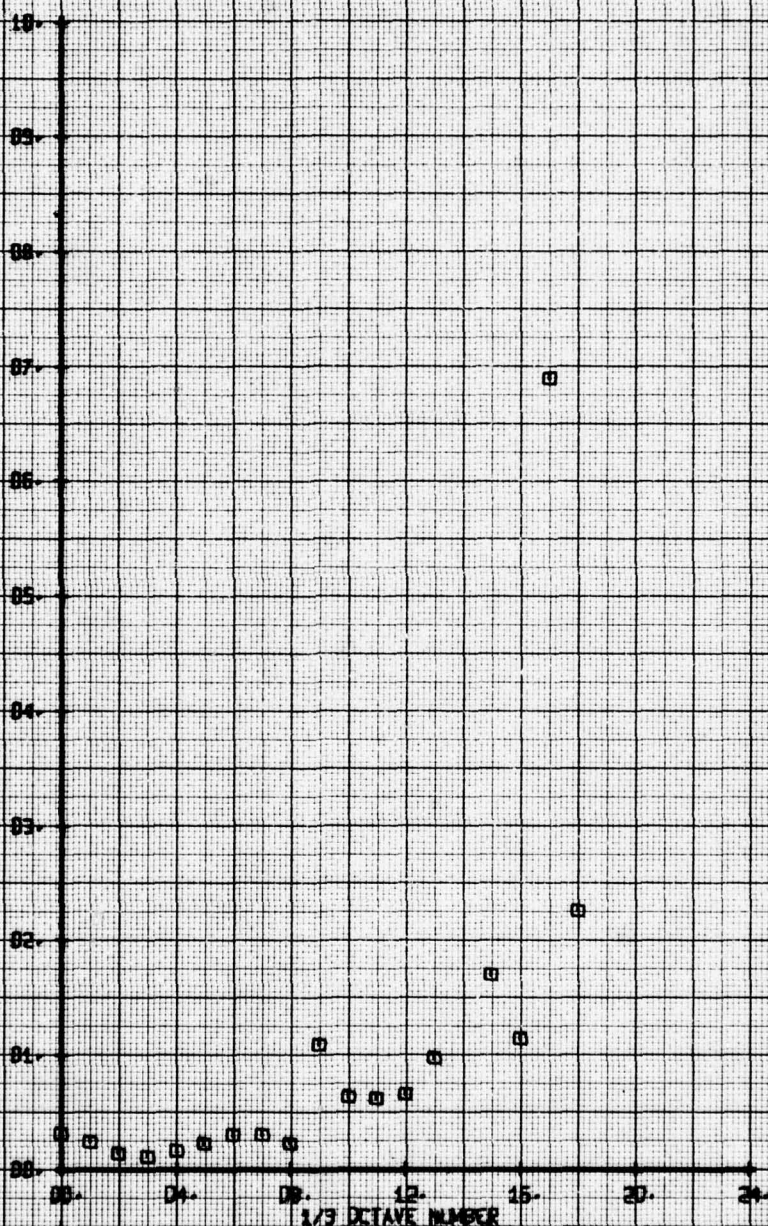


NON FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RM 170 TP 2

SYM
 0

LEGEND
 CH
 00
 PARAMETER
 ALPHA

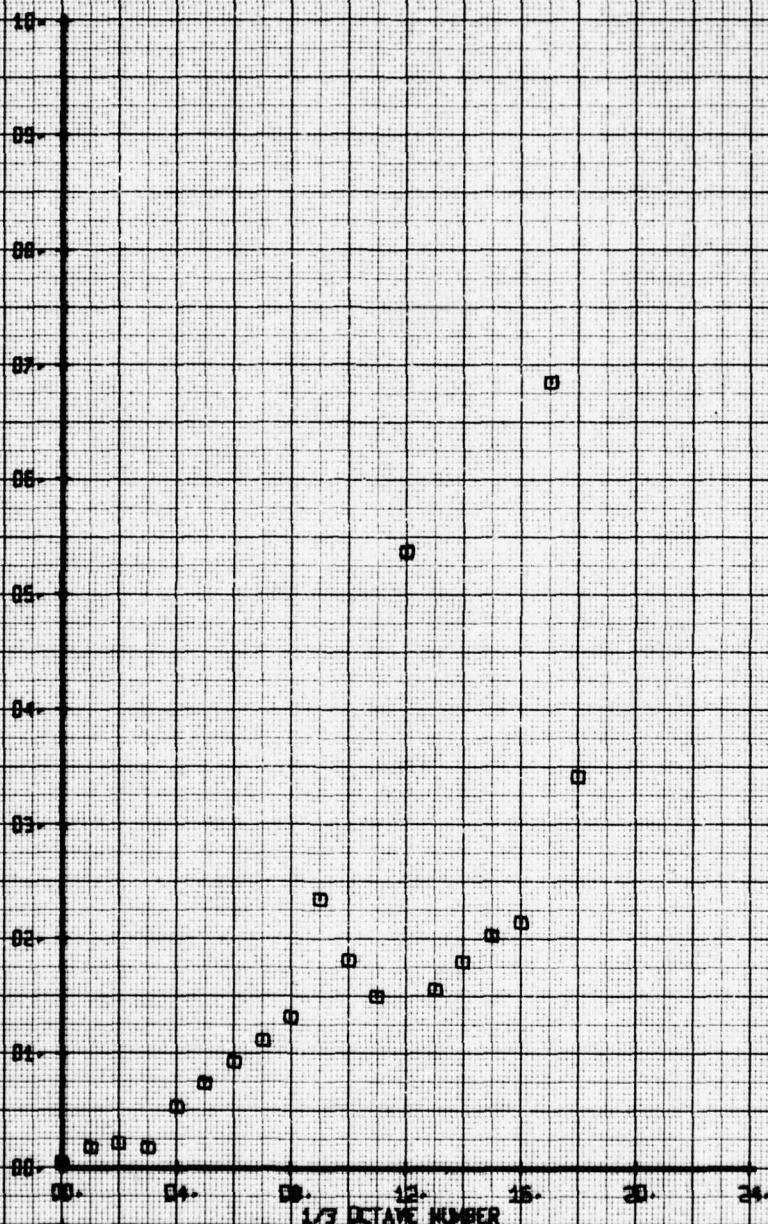
VERTICAL FLOW ANGLE, ALPHA - DEGREES



NET FILM WAVE 1/3 OCTAVE ANALYSIS
EXTENDED FLAT TOP CROWN FAIRING
RIM 170 TP 8

SYN CH PARAMETER
0 66 ALPHA

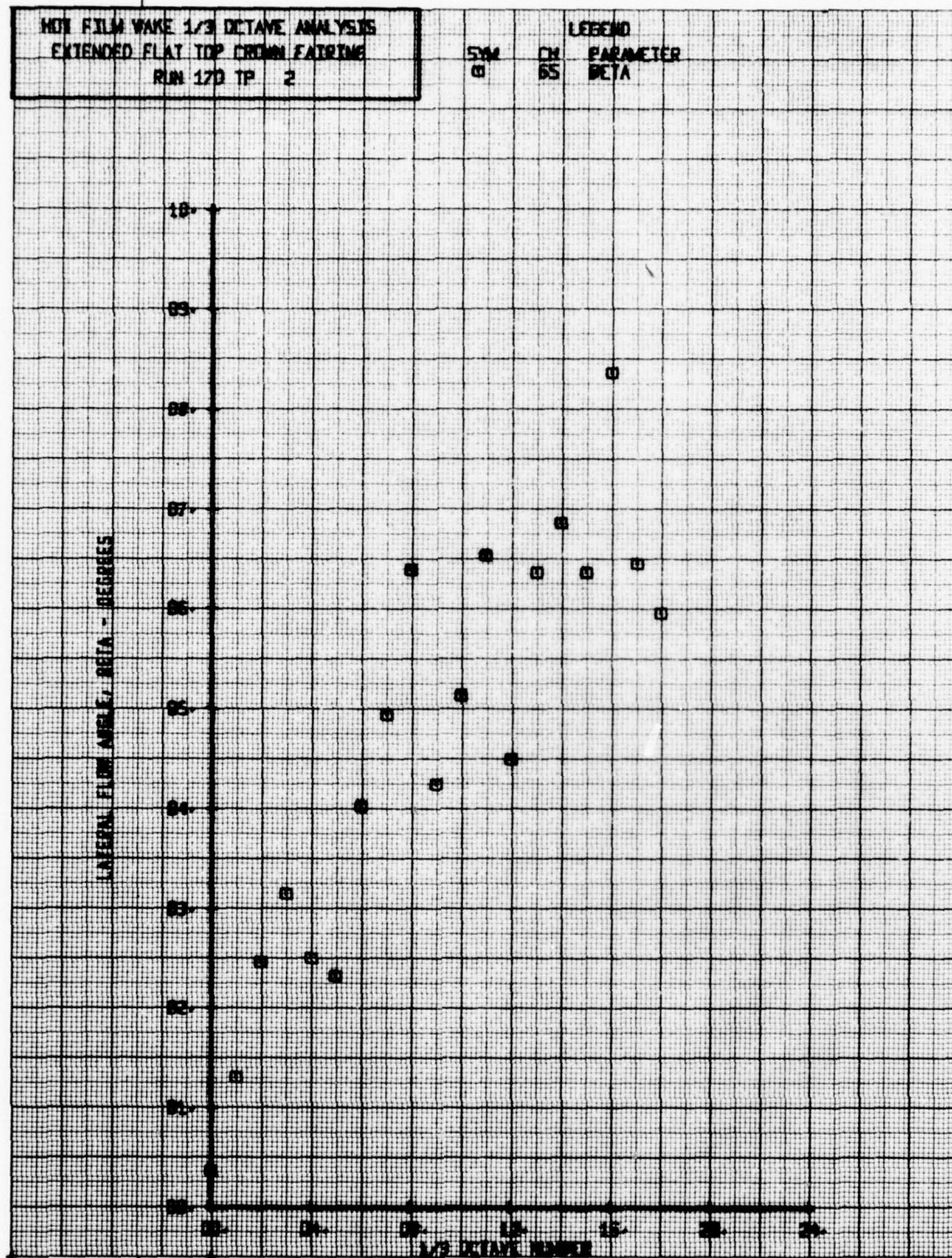
VERTICAL FIRM ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FATIGUE
 RUN 170 TP 2

SYM CH PARAMETER
 0 65 BETA

INTERNAL FLOW ANGLE, BETA - DEGREES



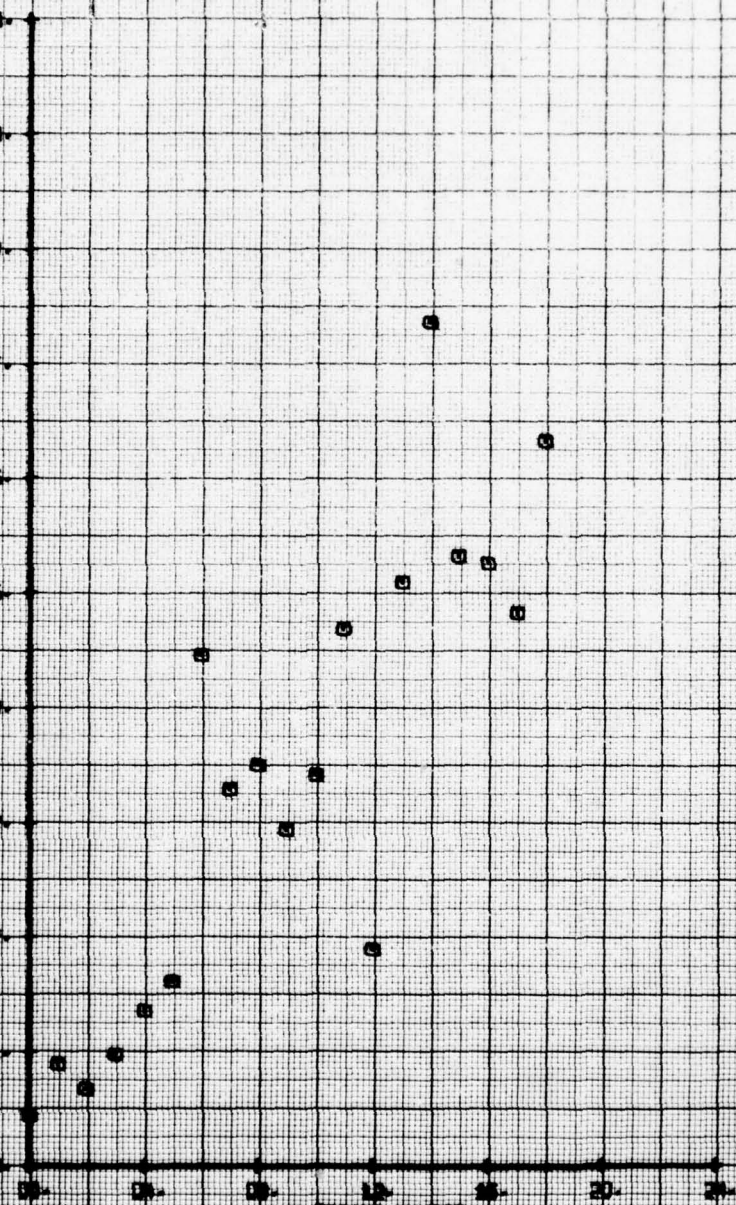
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 17D TP 3

SYM CH PARAMETER
 0 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

10
09
08
07
06
05
04
03
02
01
00

1/3 OCTAVE NUMBER



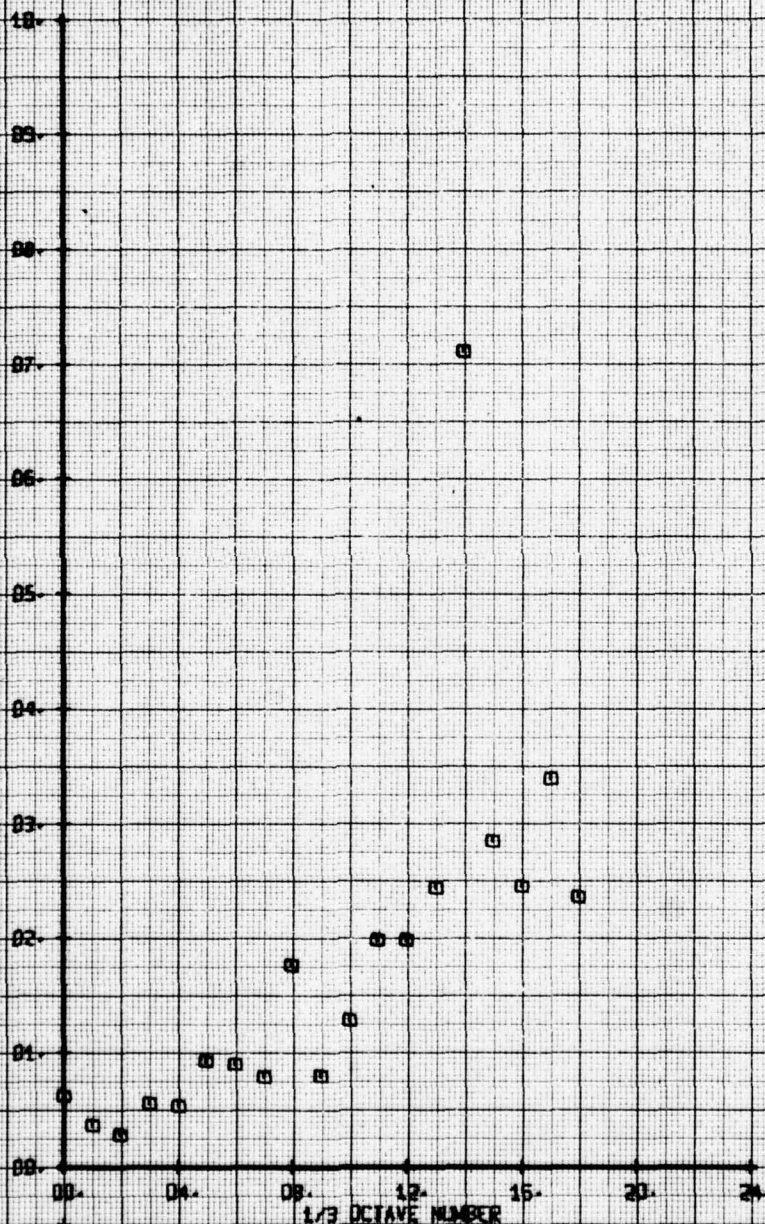
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CREWM FAIRING
 RUN 170 TP 4

SYM
 O

CH
 65

LEGEND
 PARAMETER
 BETA

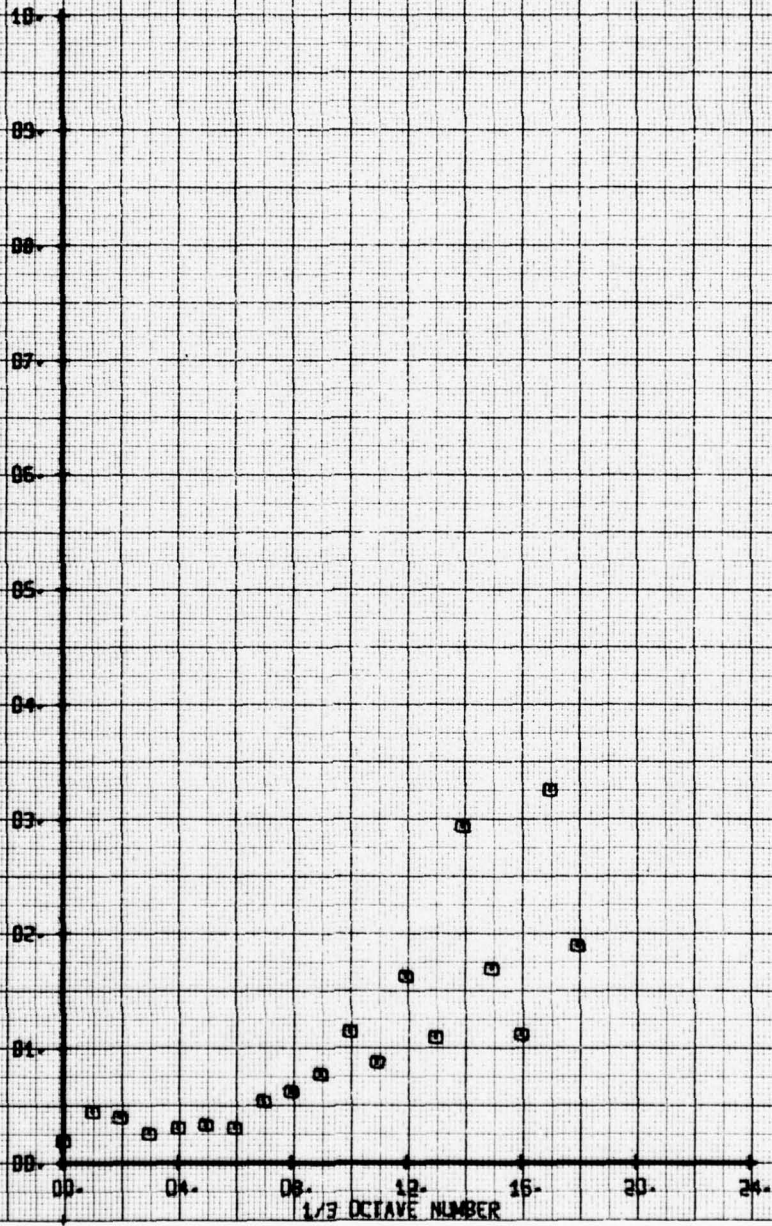
LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRTIME
 RUN 120 TP 5

LEGEND
 CH 65
 PARAMETER
 BETA

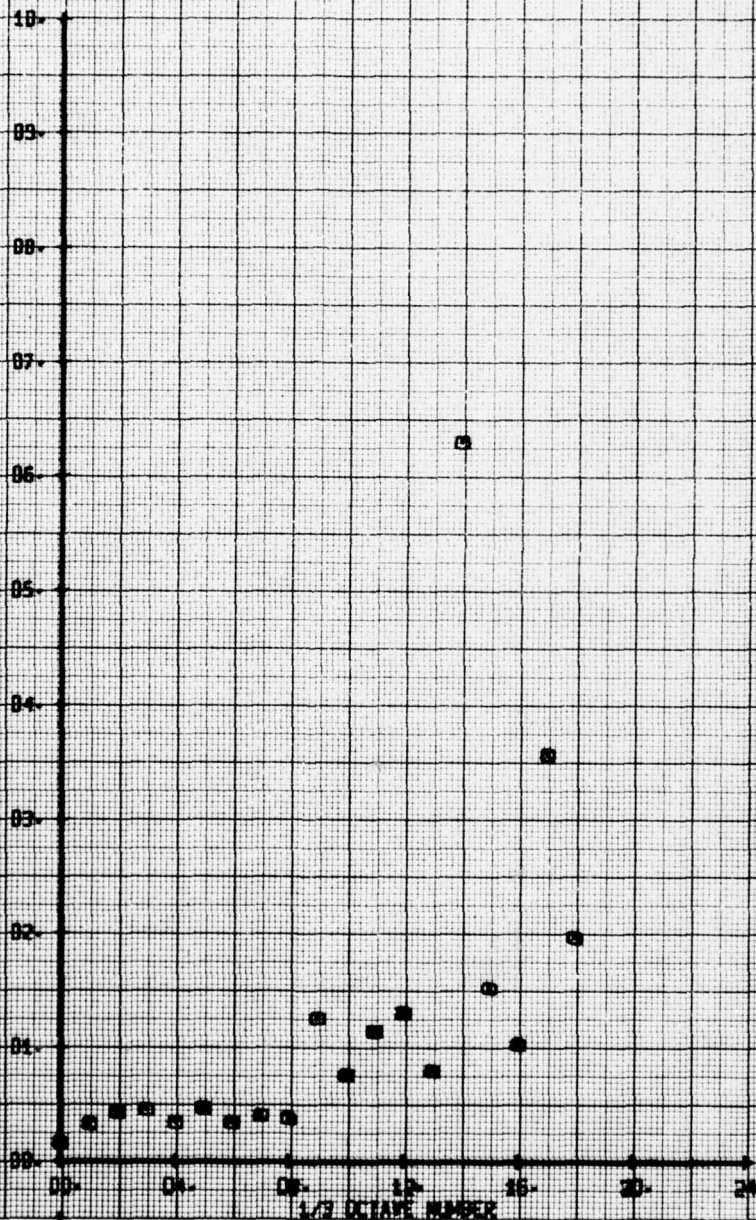
LATERAL FLOW ANGLE, BETA - DEGREES



NOI FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 6

LEGEND
 SYM CH PARAMETER
 O 65 BETA

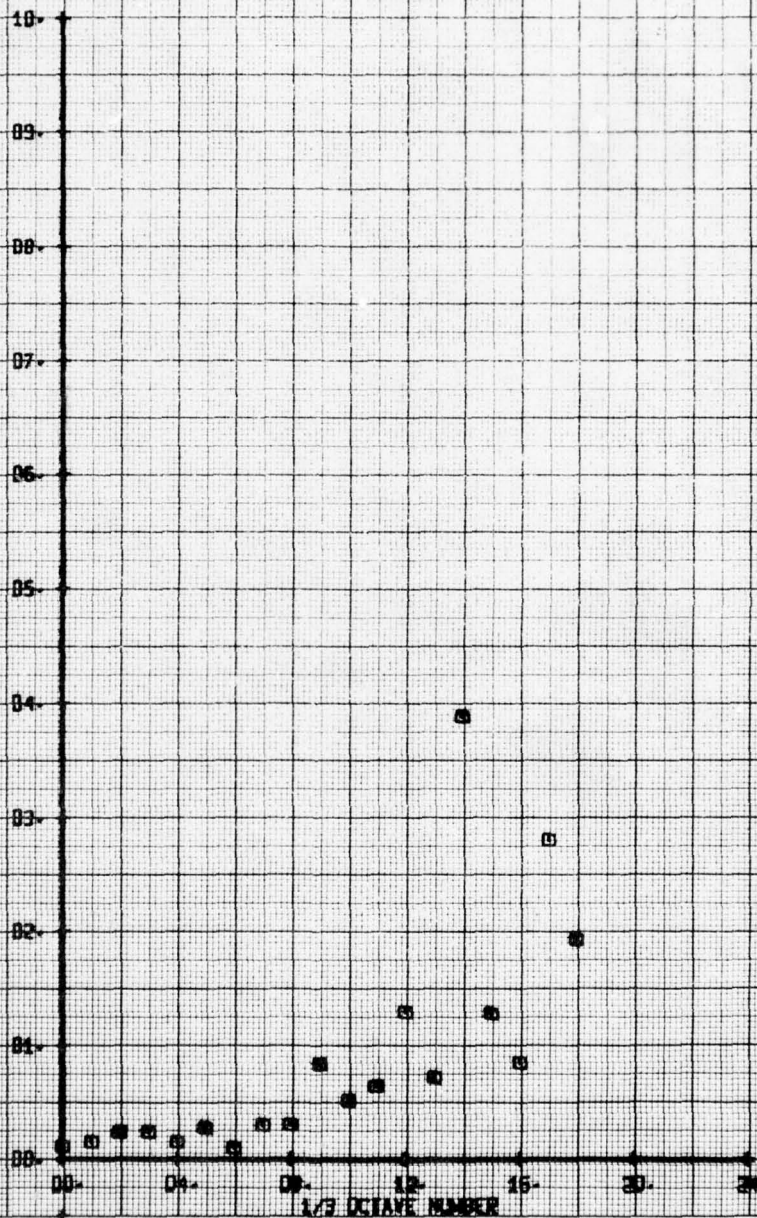
LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 17D TP 7

SYM	CH	LEGEND
□	65	PARAMETER BETA

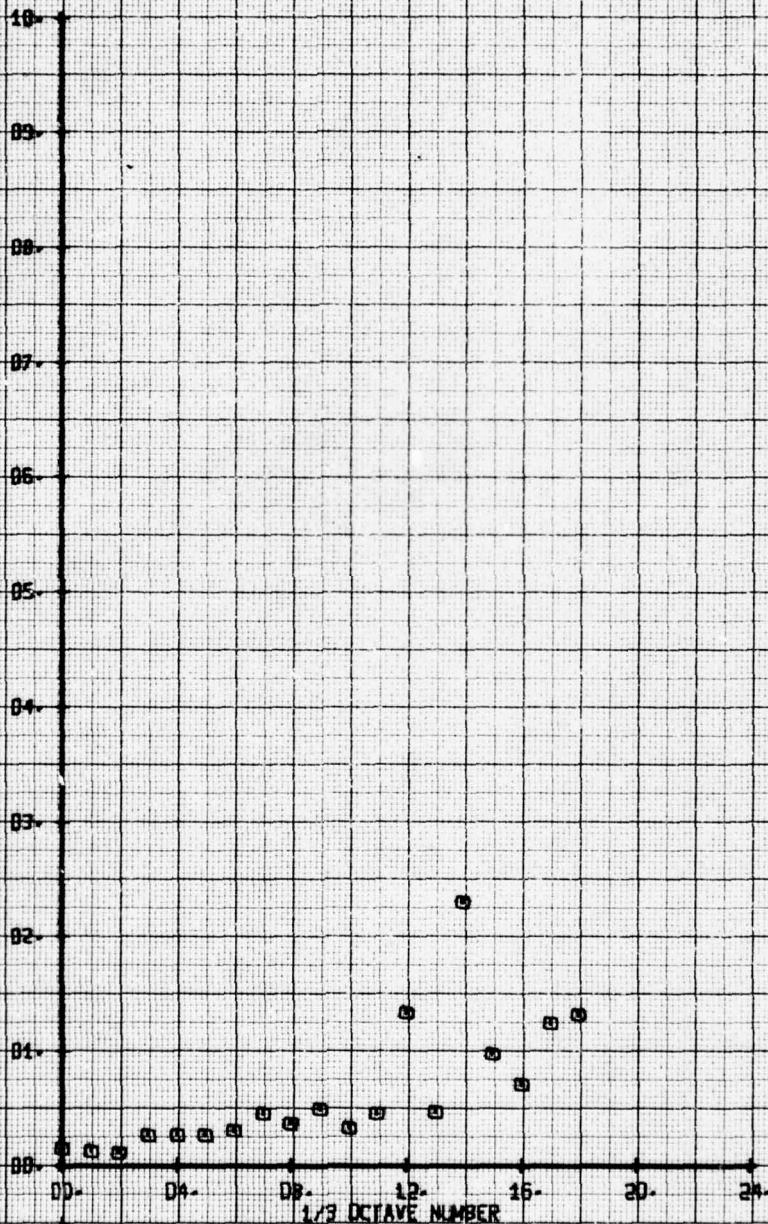
LATERAL FLOW ANGLE, BETA - DEGREES



NOX FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 8

LEGEND
 SW CH PARAMETER
 0 65 BETA

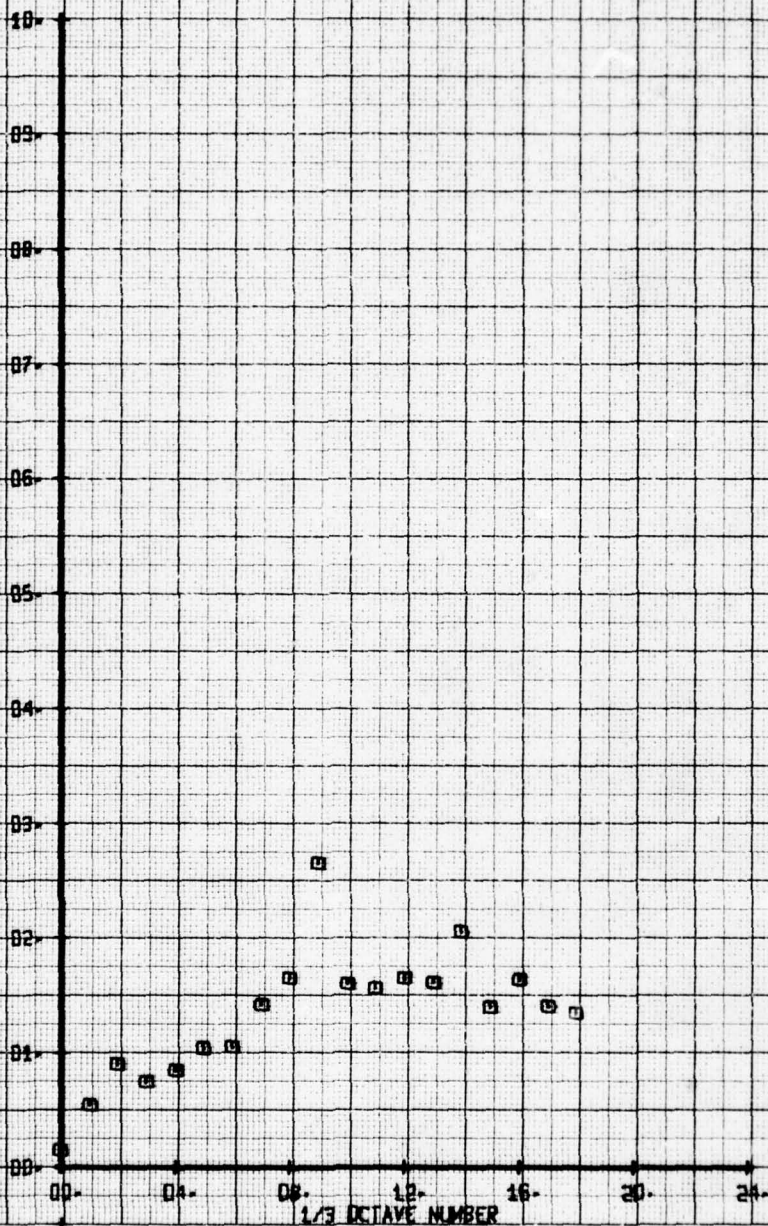
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 120 TP 2

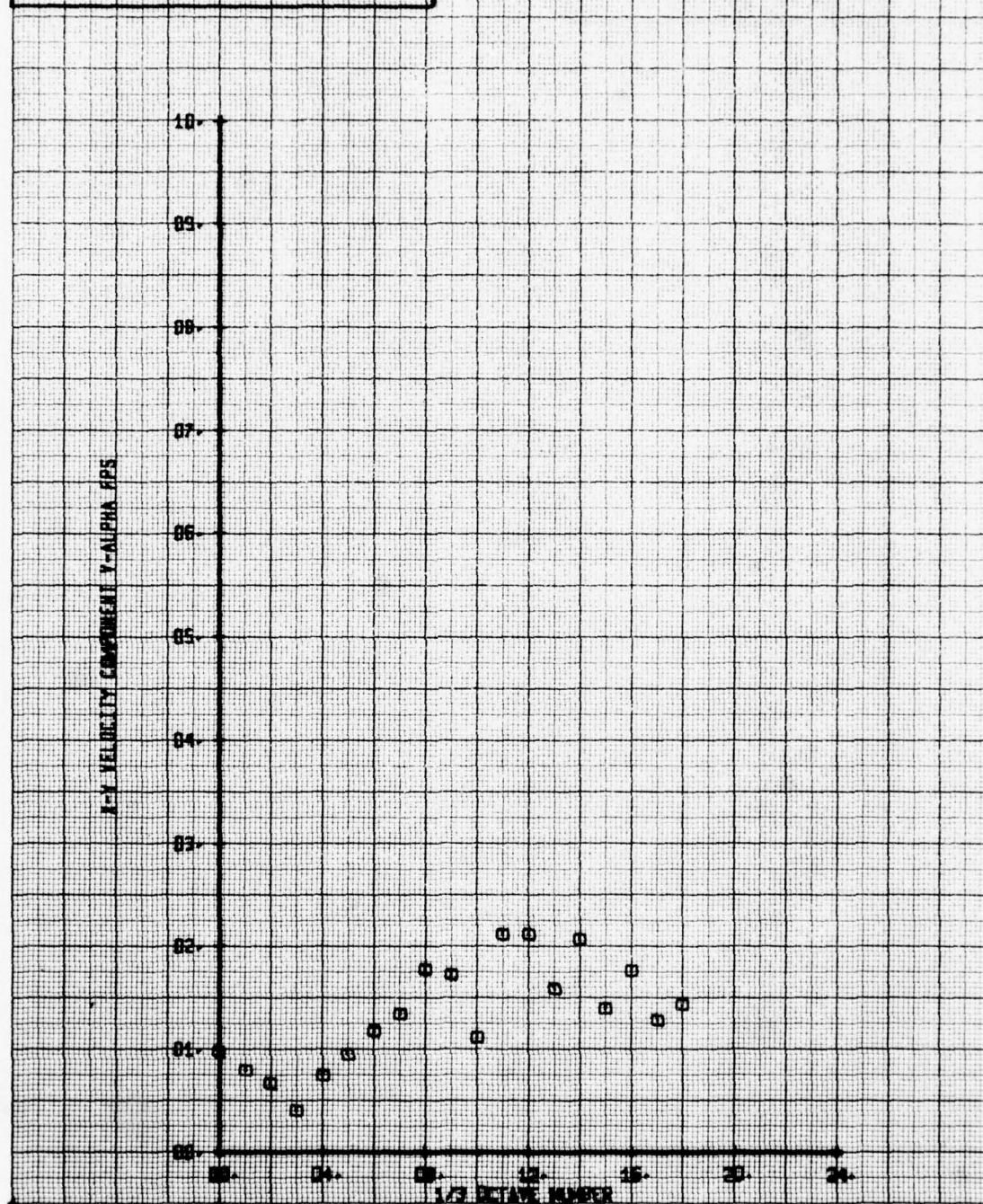
LEGEND
 CH 66
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



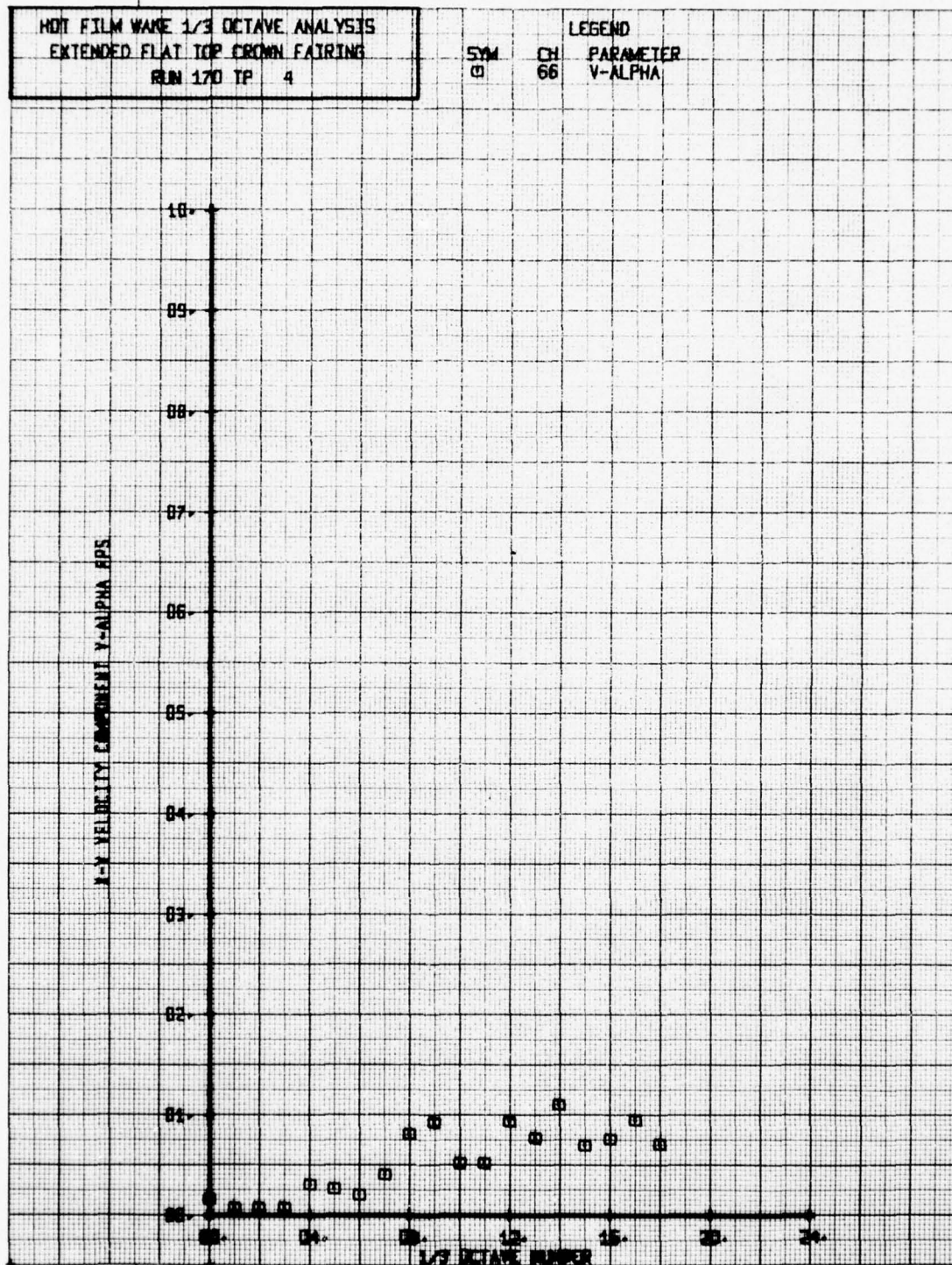
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 3

SYM	CH	LEGEND	PARAMETER
0	66		V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 4

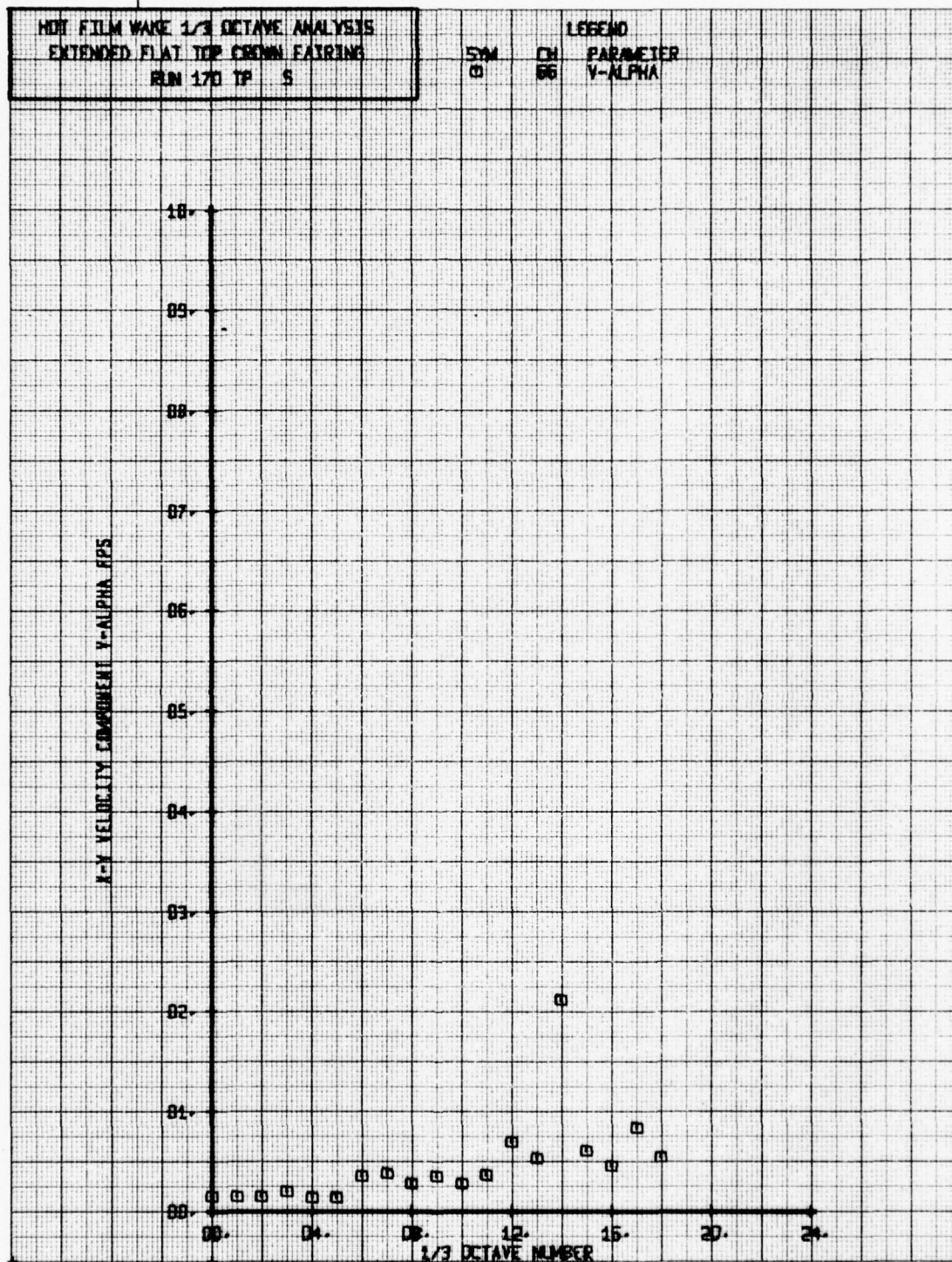
SYM	CH	PARAMETER
0	66	V-ALPHA



HDT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP S

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

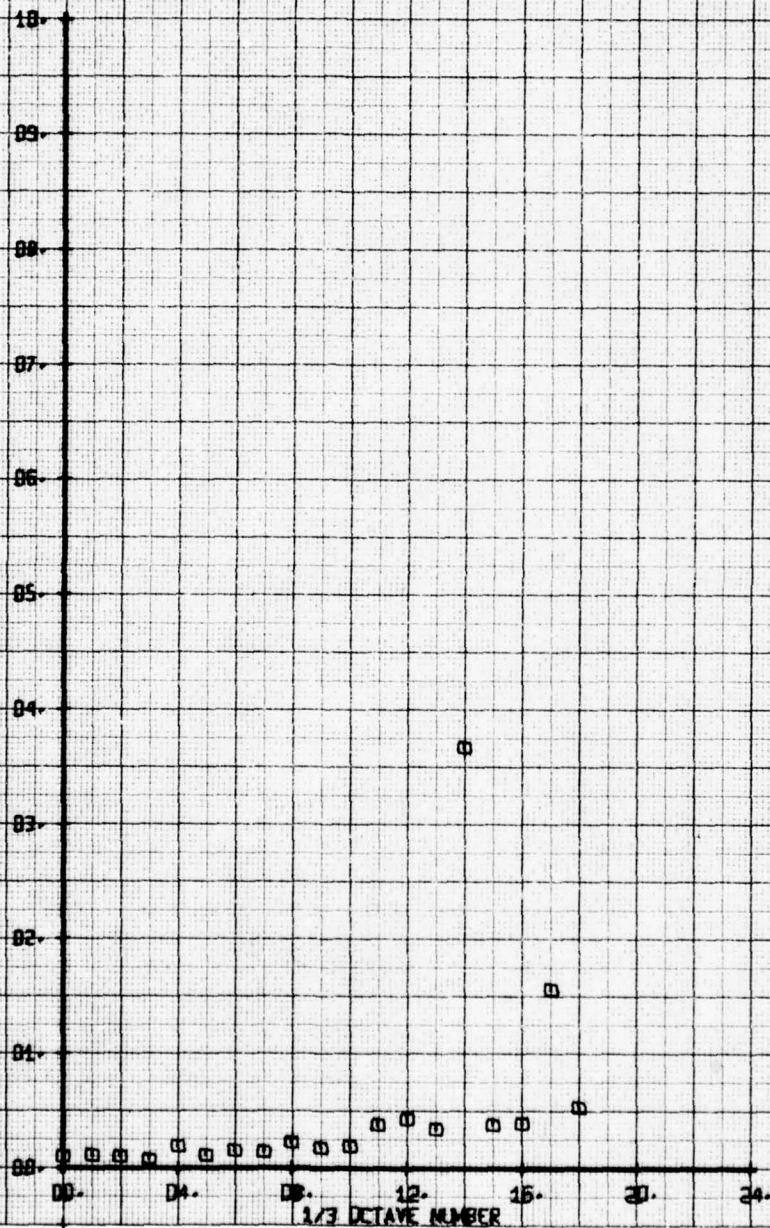
X-Y VELOCITY COMPONENT V-ALPHA FPS



MOV FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 6

LEGEND		
SYM	CH	PARAMETER
□	66	V-ALPHA

K-Y VELOCITY COMPONENT V-ALPHA FPS



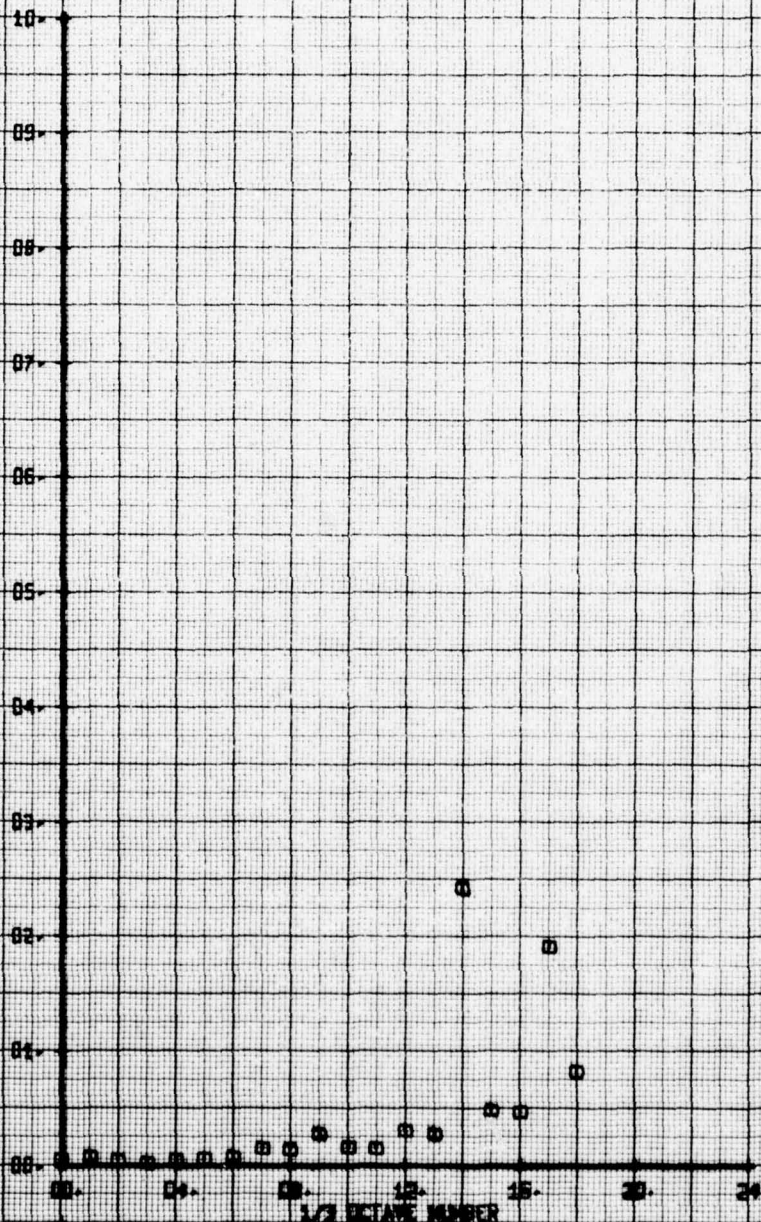
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 7

SYM
 0

CH
 66

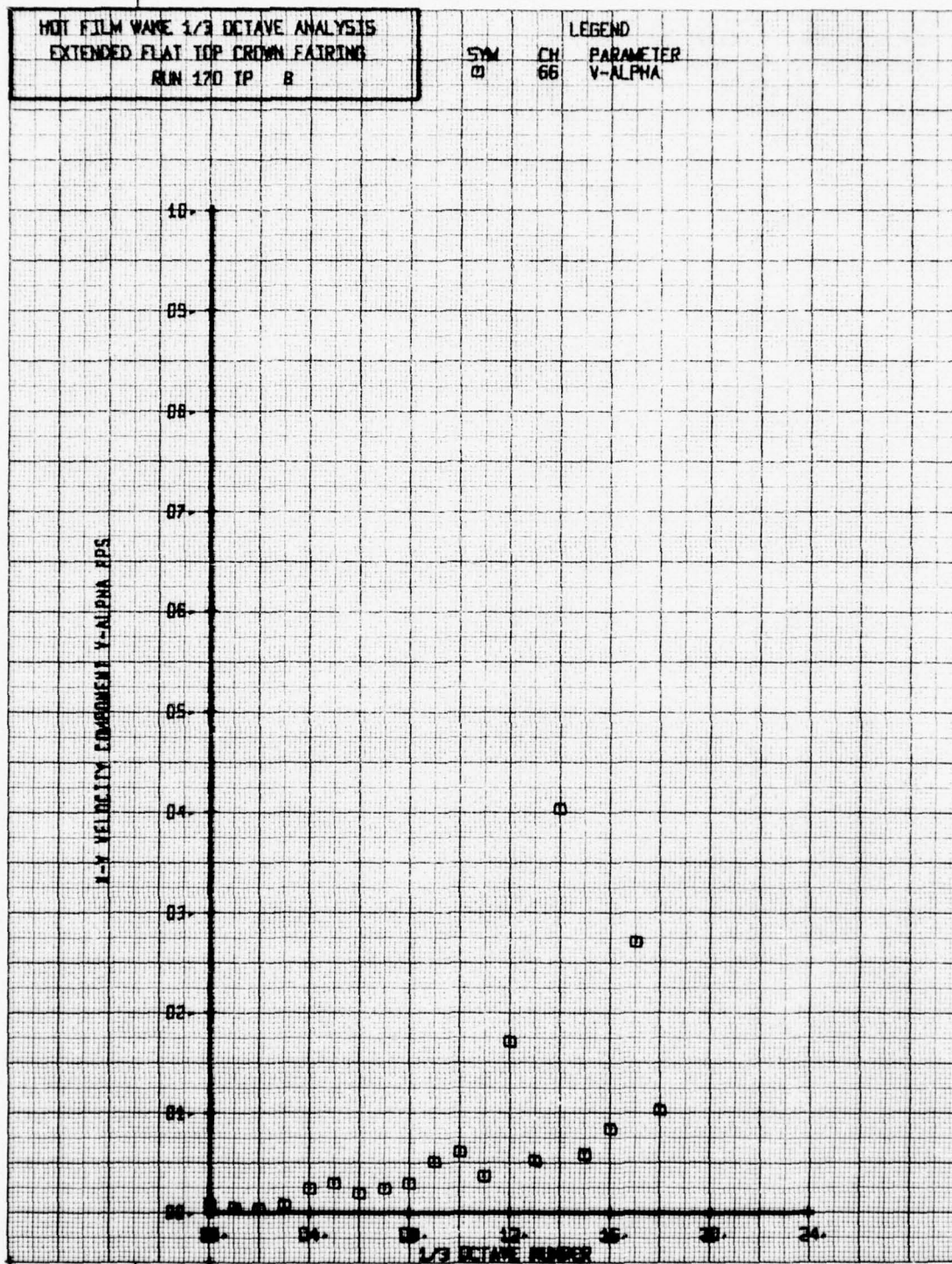
LEGEND
 PARAMETER
 V-ALPHA

V-V VELOCITY COMPONENT V-ALPHA RPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 8

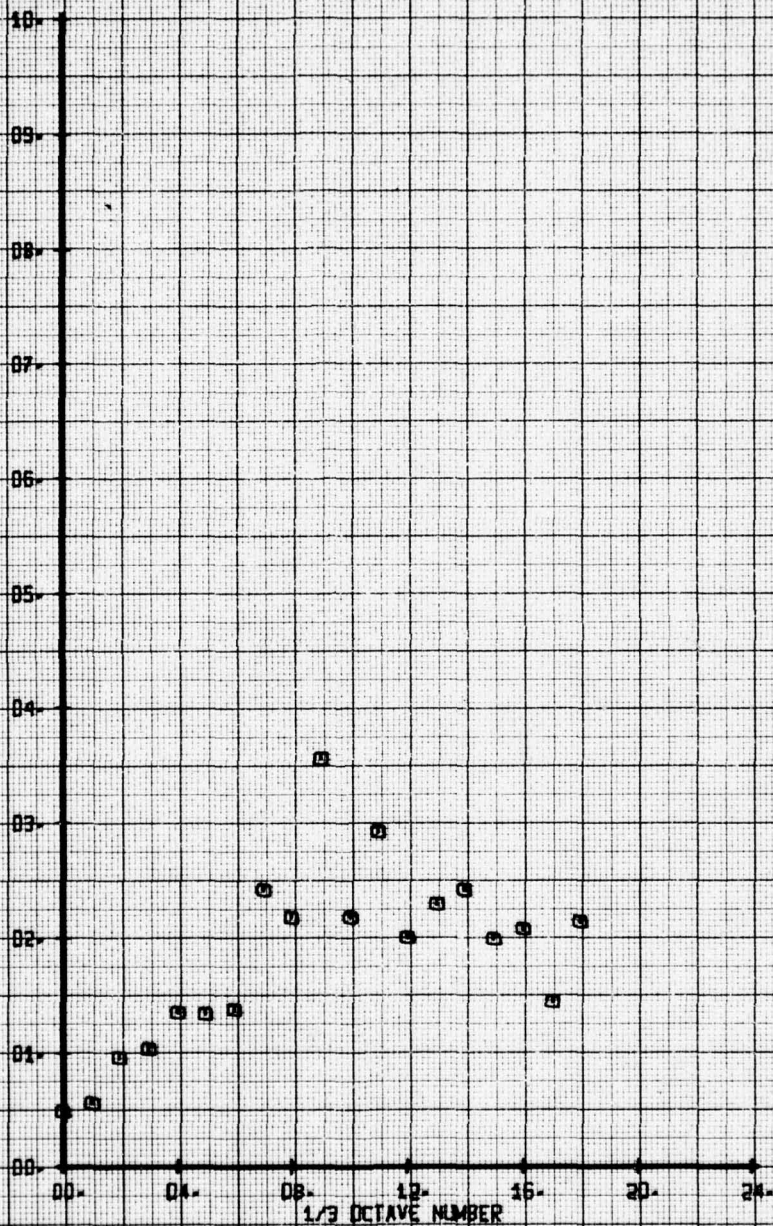
SYM	CH	PARAMETER
0	66	V-ALPHA



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 17D TP 2

SUM CH PARAMETER
 00 65 V-BETA

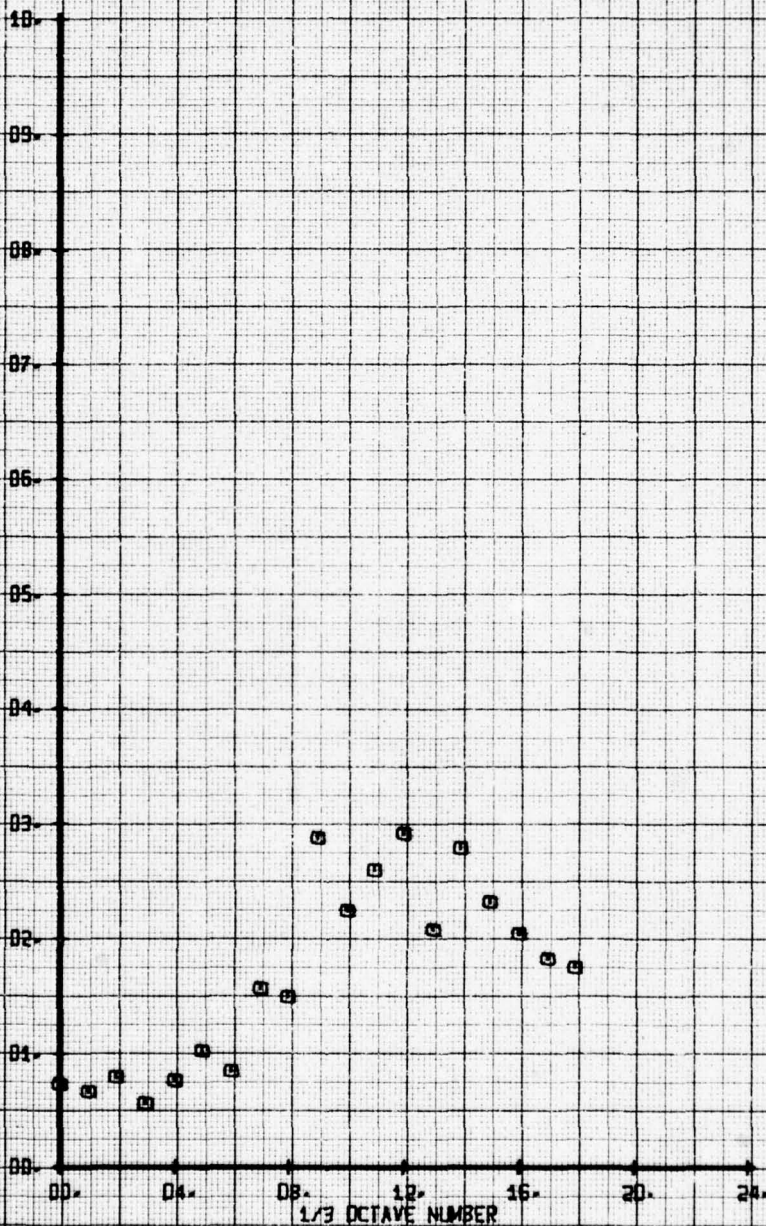
X-2 VELOCITY COMPONENT V-BETA FPS



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 17D 1P 3

LEGEND	
SYM	CH
⊙	65
PARAMETER	
V-BETA	

K-2 VELOCITY COMPONENT V-BETA FPS



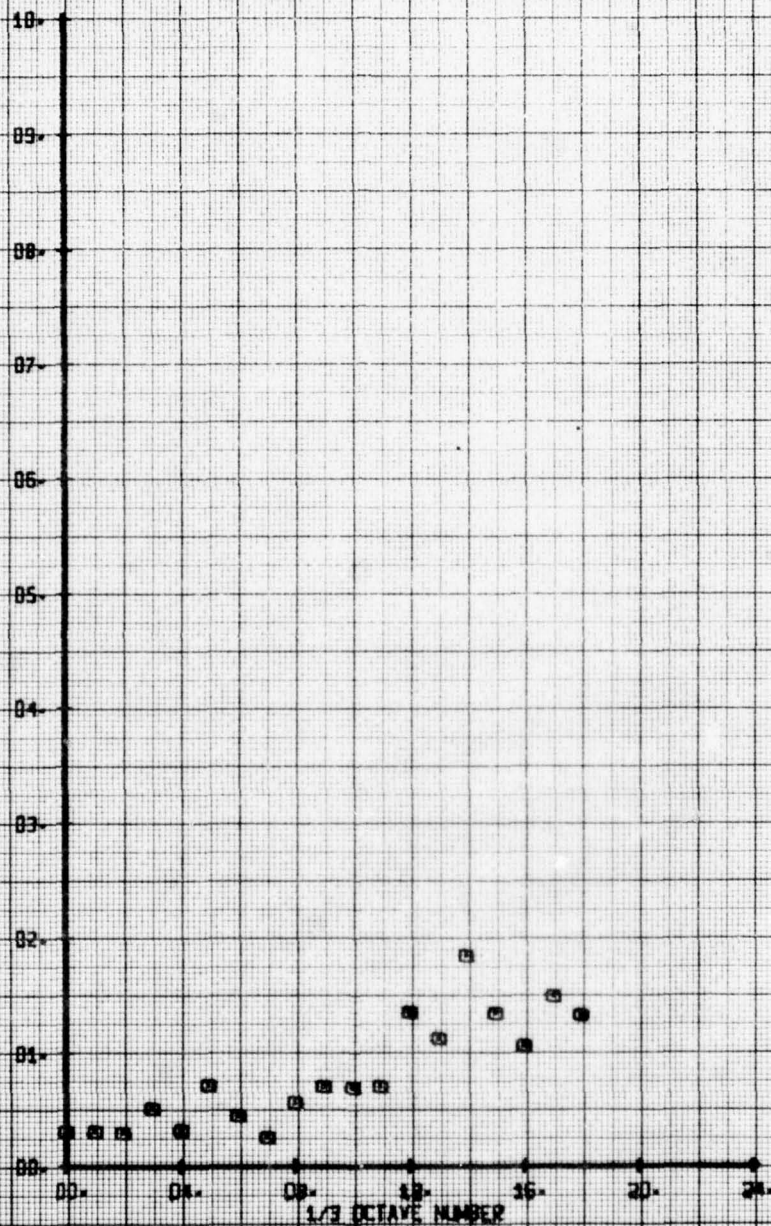
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 17D TP 4

SMM
 0

CH
 65

LEGEND
 PARAMETER
 V-BETA

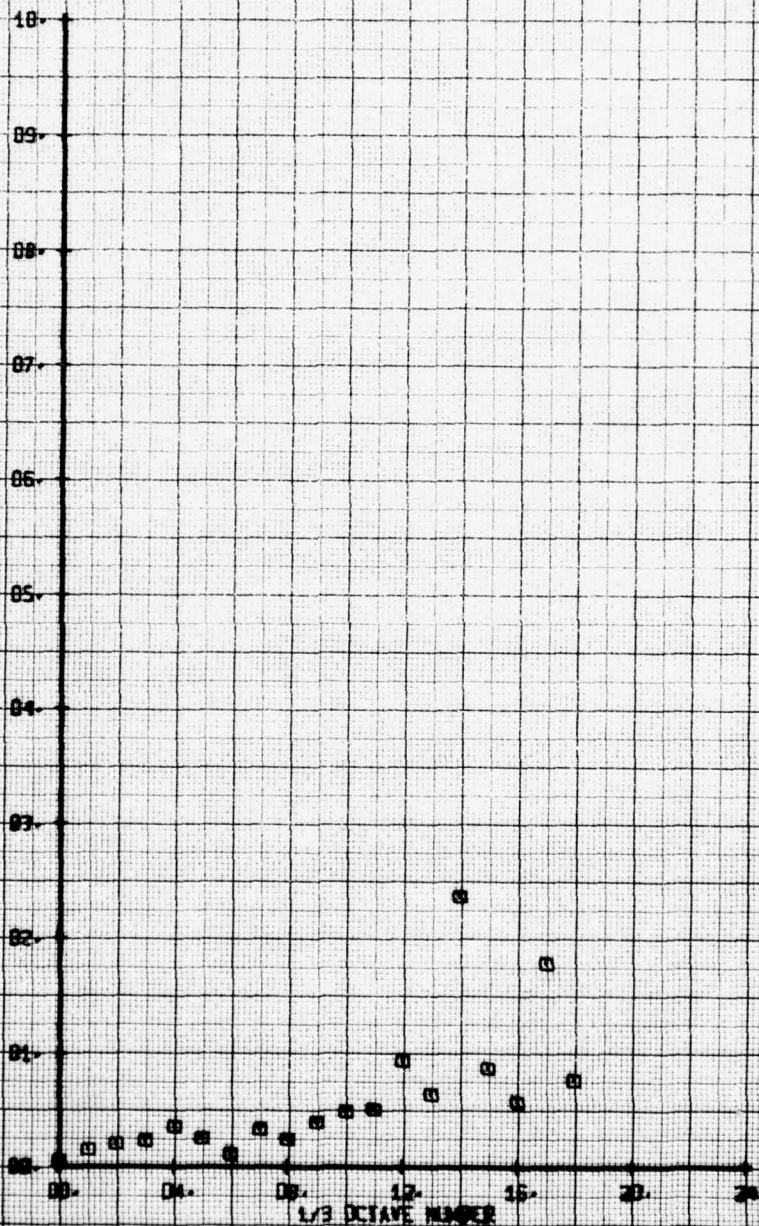
X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 17D TP 5

SYM	CH	LEGEND
□	65	PARAMETER V-BETA

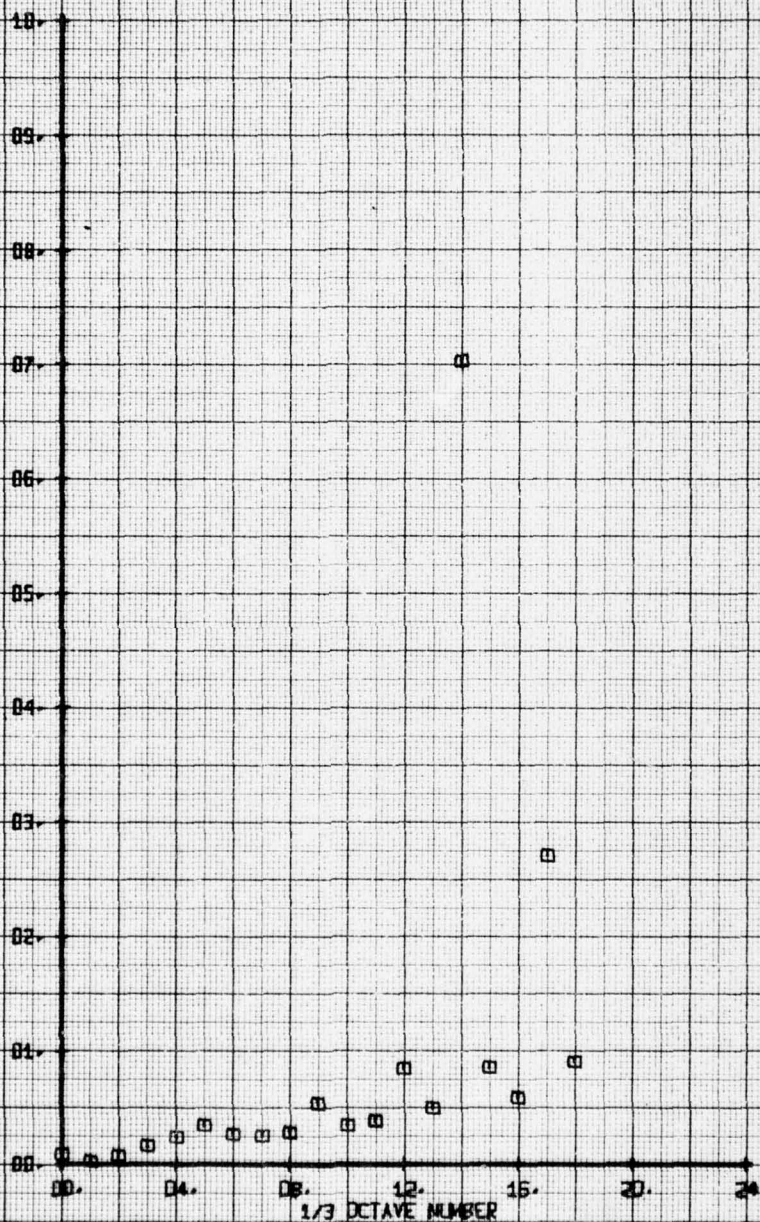
X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 6

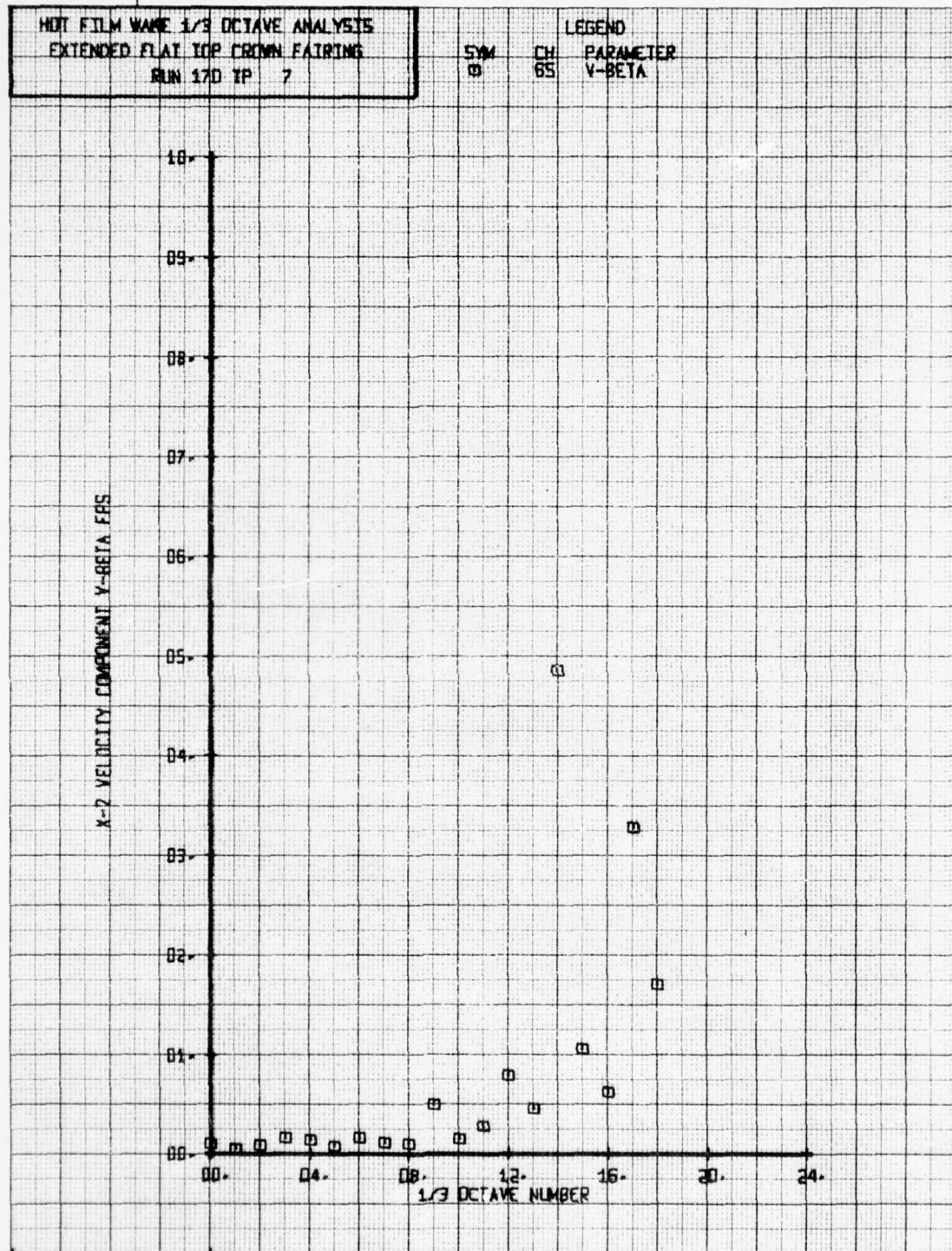
LEGEND	
SYM	CH
□	65
	PARAMETER
	V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



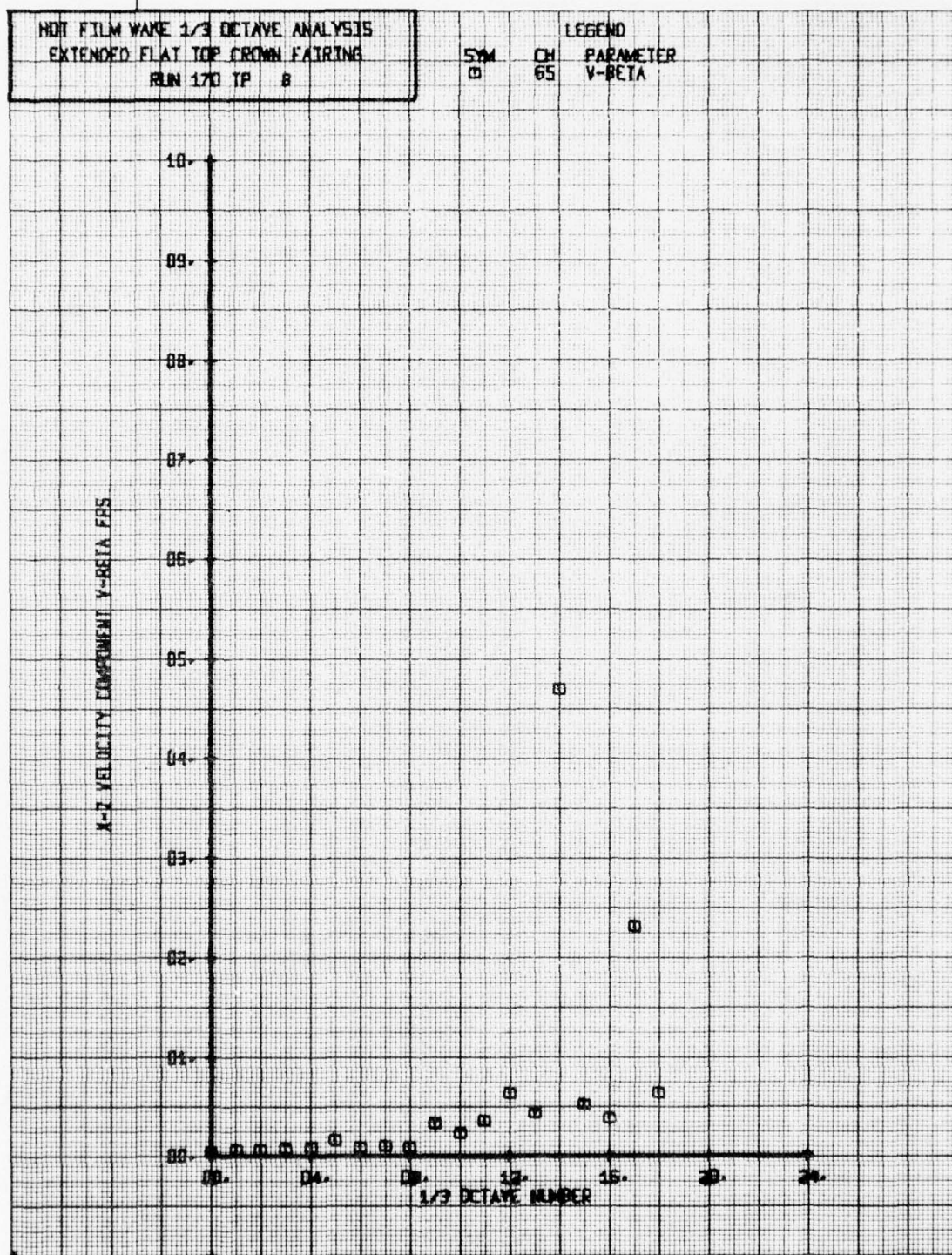
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 7

SYN CH PARAMETER
 00 65 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EXTENDED FLAT TOP CROWN FAIRING
 RUN 170 TP 8

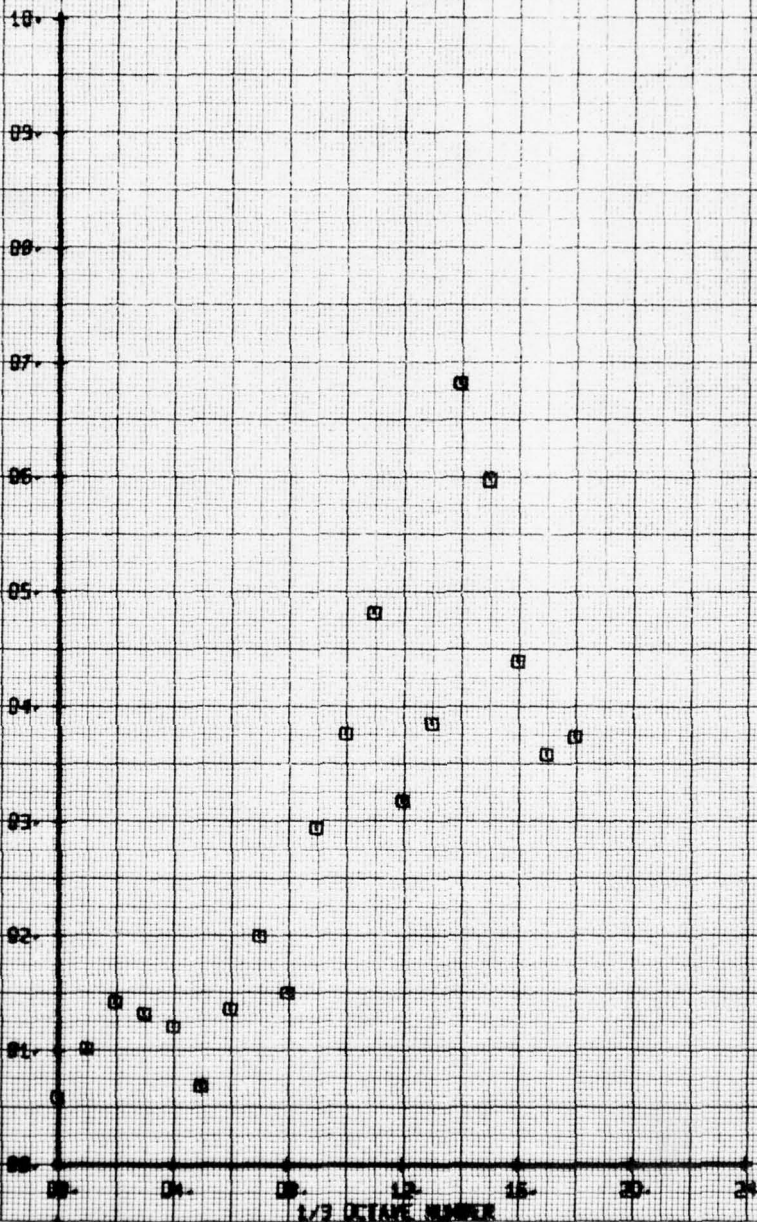
LEGEND
 CH 65
 PARAMETER
 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRYN FAIR-16 PARASON, 4.0GP
 RUN 171 TP 2

SYM	CH	PARAMETER
□	56	ALPHA

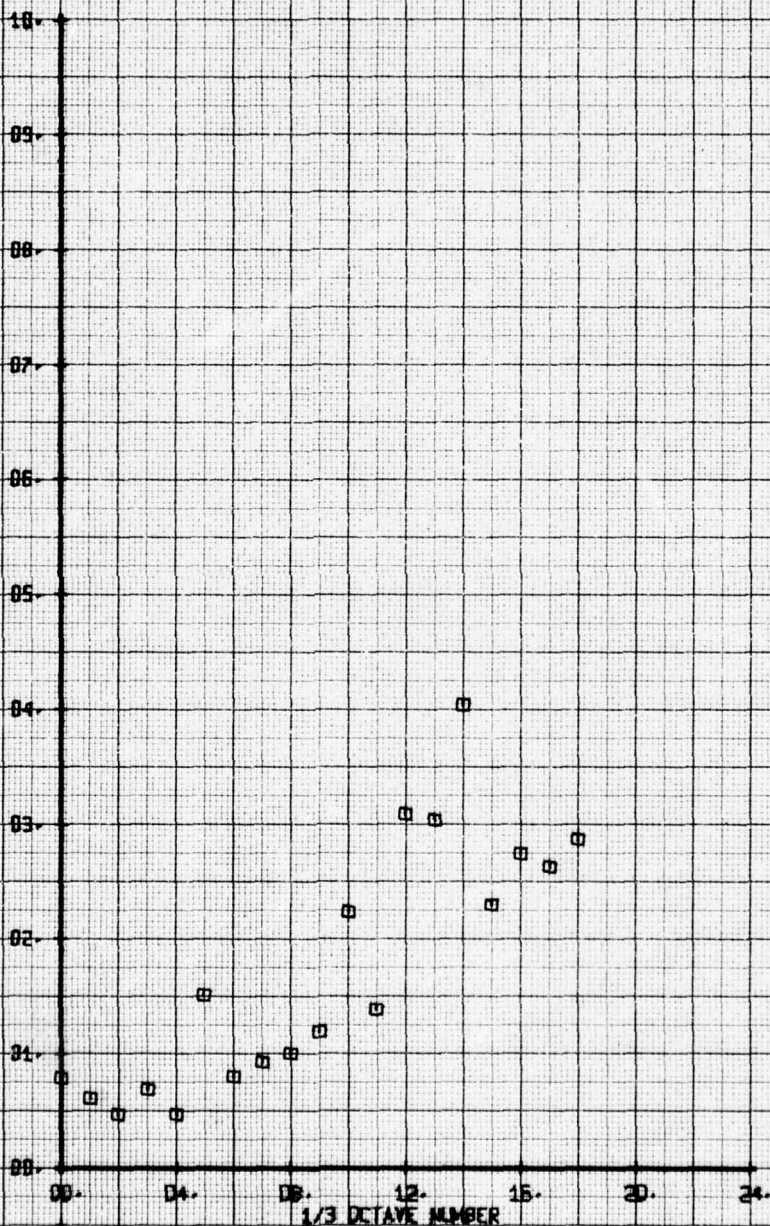
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CROWN FAIR-16 PARASOL, 4-0GP
 RUN 171 TP 3

LEGEND		
SYM	CH	PARAMETER
□	66	ALPHA

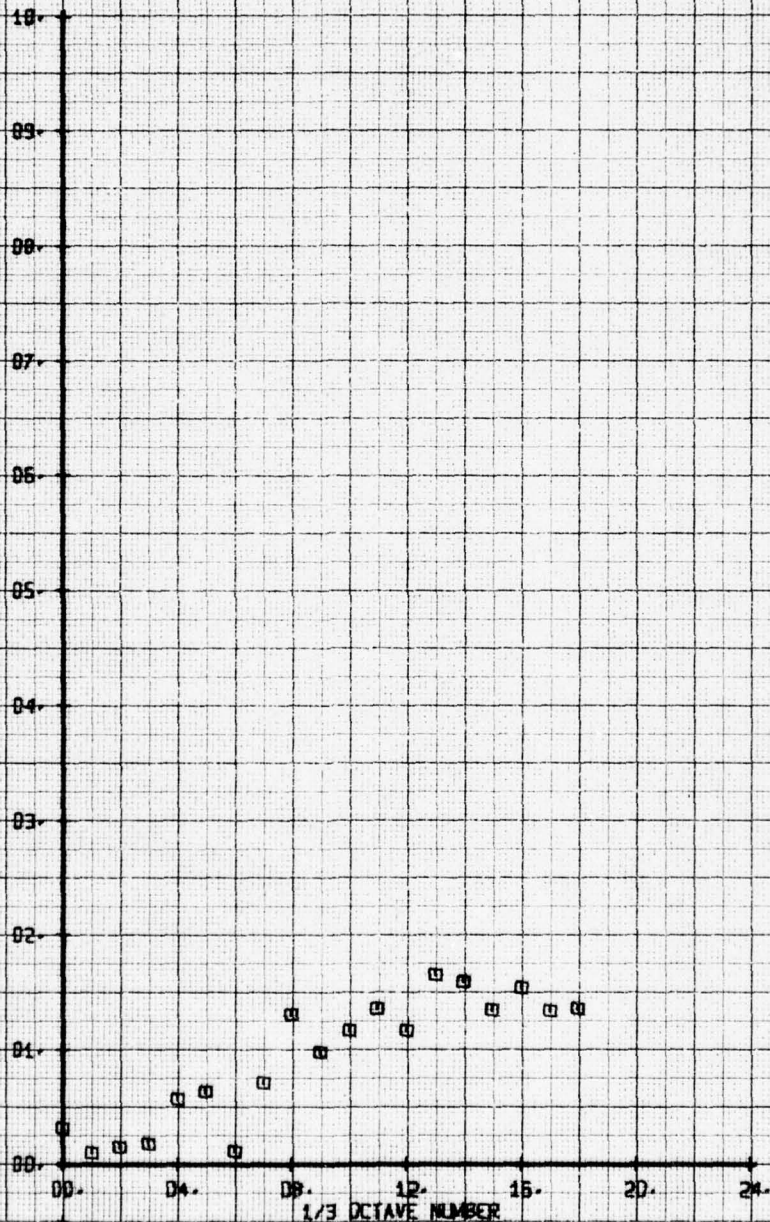
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CROWN FAIR-HIS PARASOL, 4-0GP
 RUN 171 TP 4

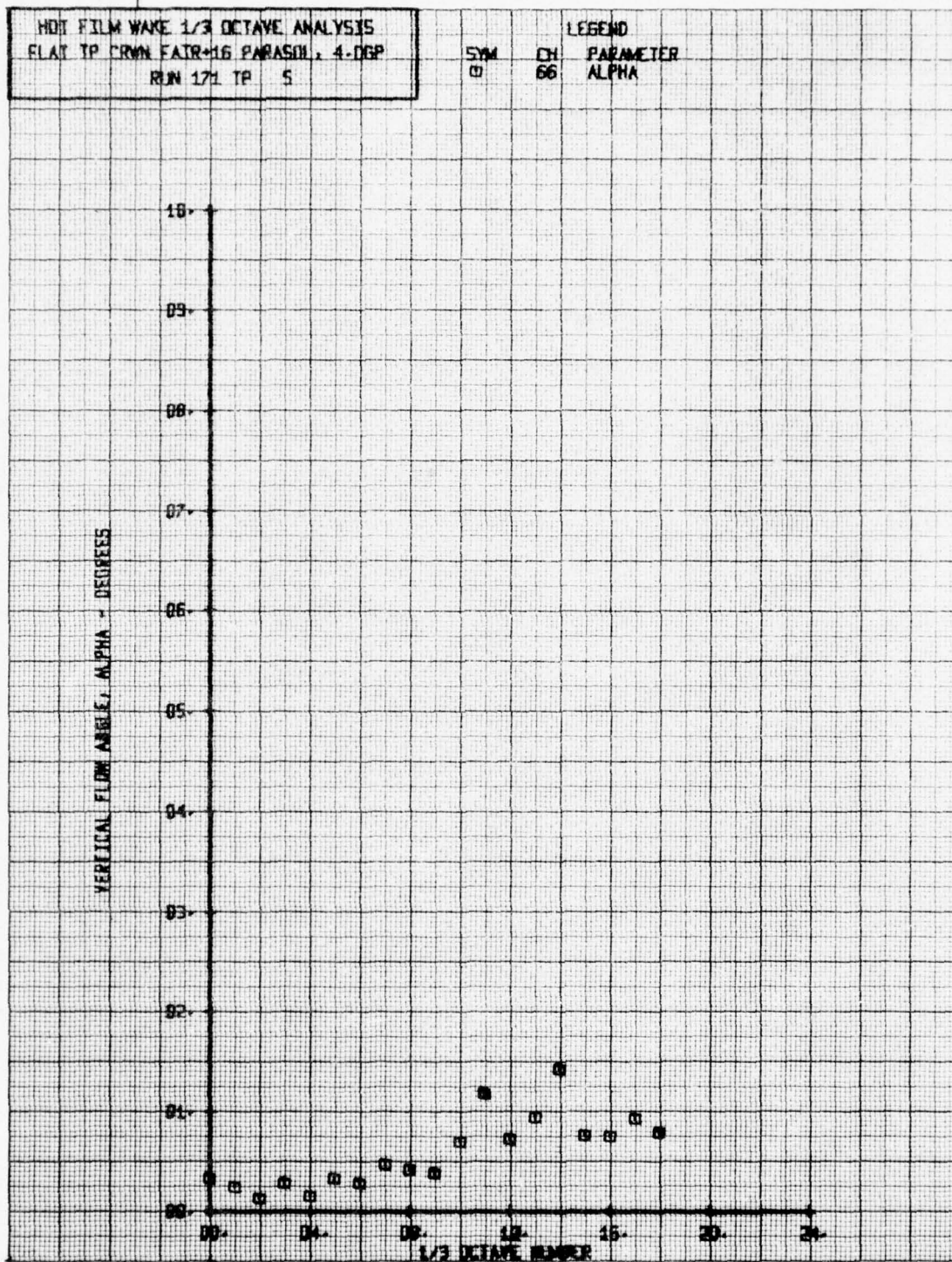
LEGEND
 CH 55
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



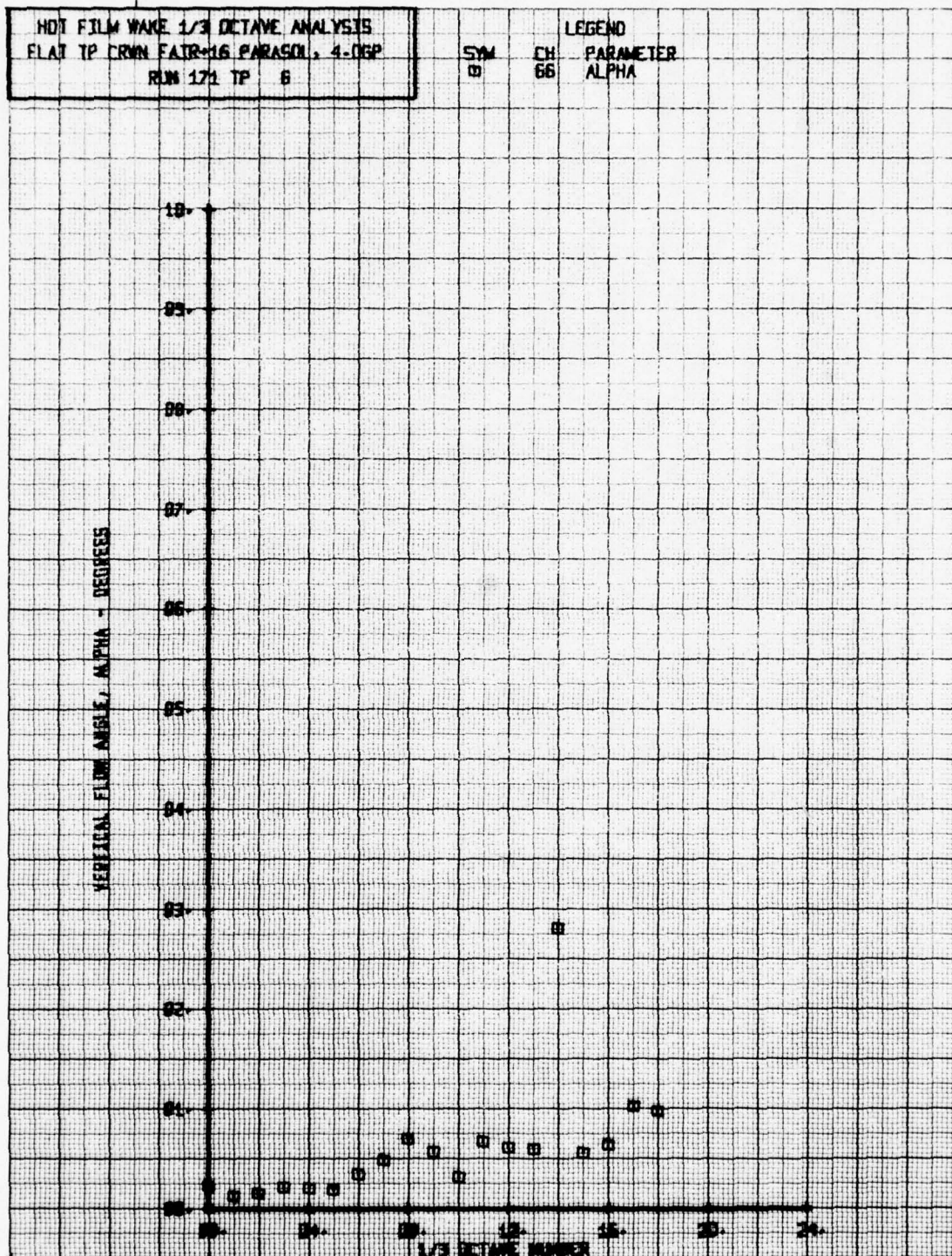
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRVN FAIR-16 PARASON, 4-DGP
 RUN 171 TP 5

LEGEND	
SYM	CH
□	66
	PARAMETER
	ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRWN FAIR-16 PARASON, 4-DEP
 RUN 171 TP 6

LEGEND	
SYM	CH
□	66
	PARAMETER
	ALPHA

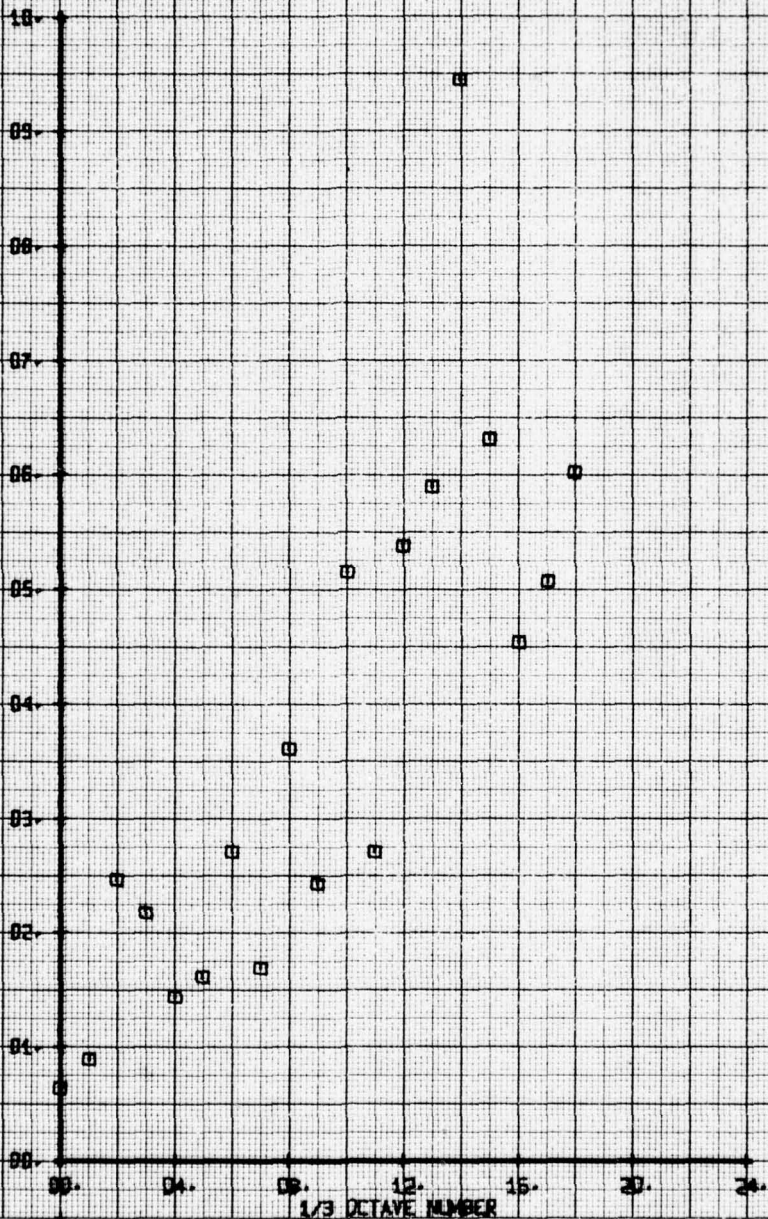


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRWN FATH-16 PARASOL, 4-03P
 RUN 171 TP 2

SYM
 □

LEGEND
 CH 65
 PARAMETER
 BETA

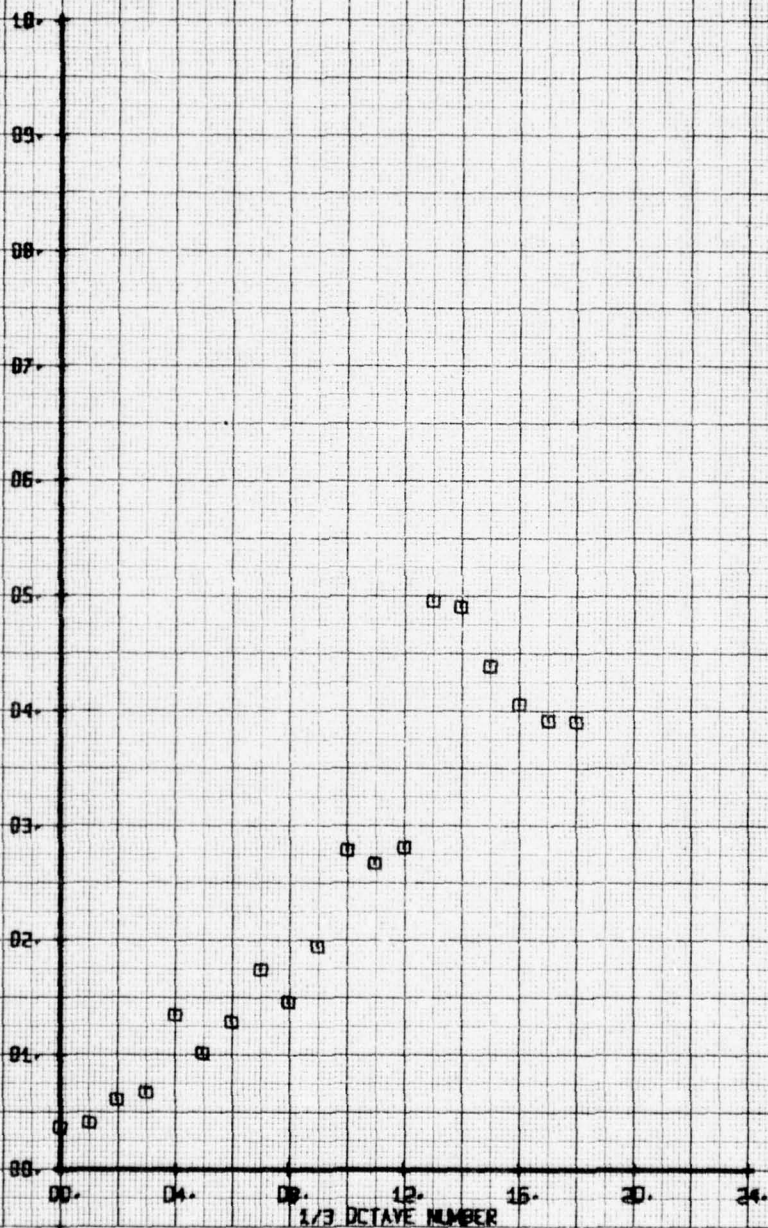
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CROWN FAIR-16 PARASON, 4-DEP
 RUN 171 TP 3

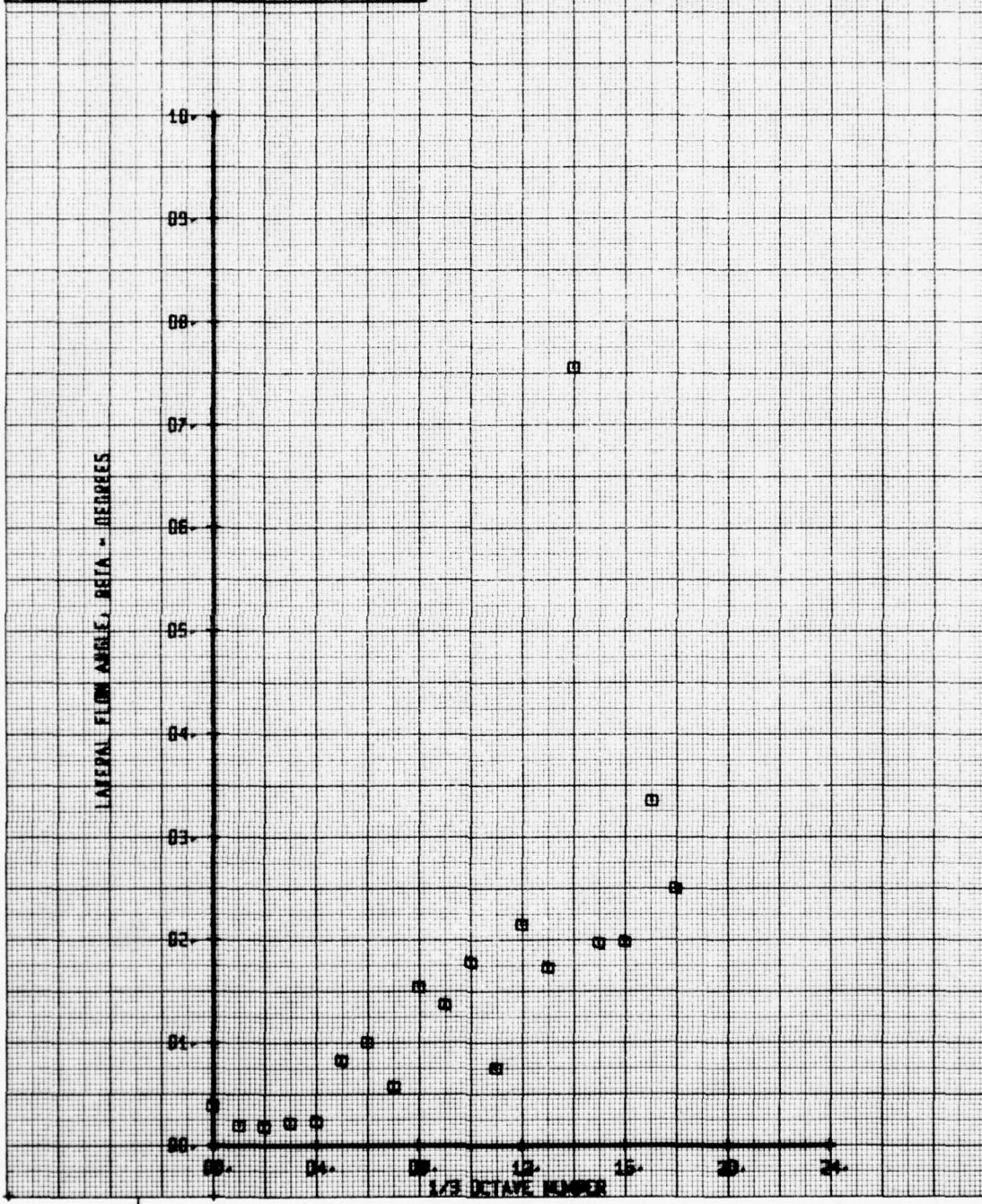
SYM	CH	PARAMETER
□	65	BETA

LATERAL FLOW ANGLE, BETA - DEGREES



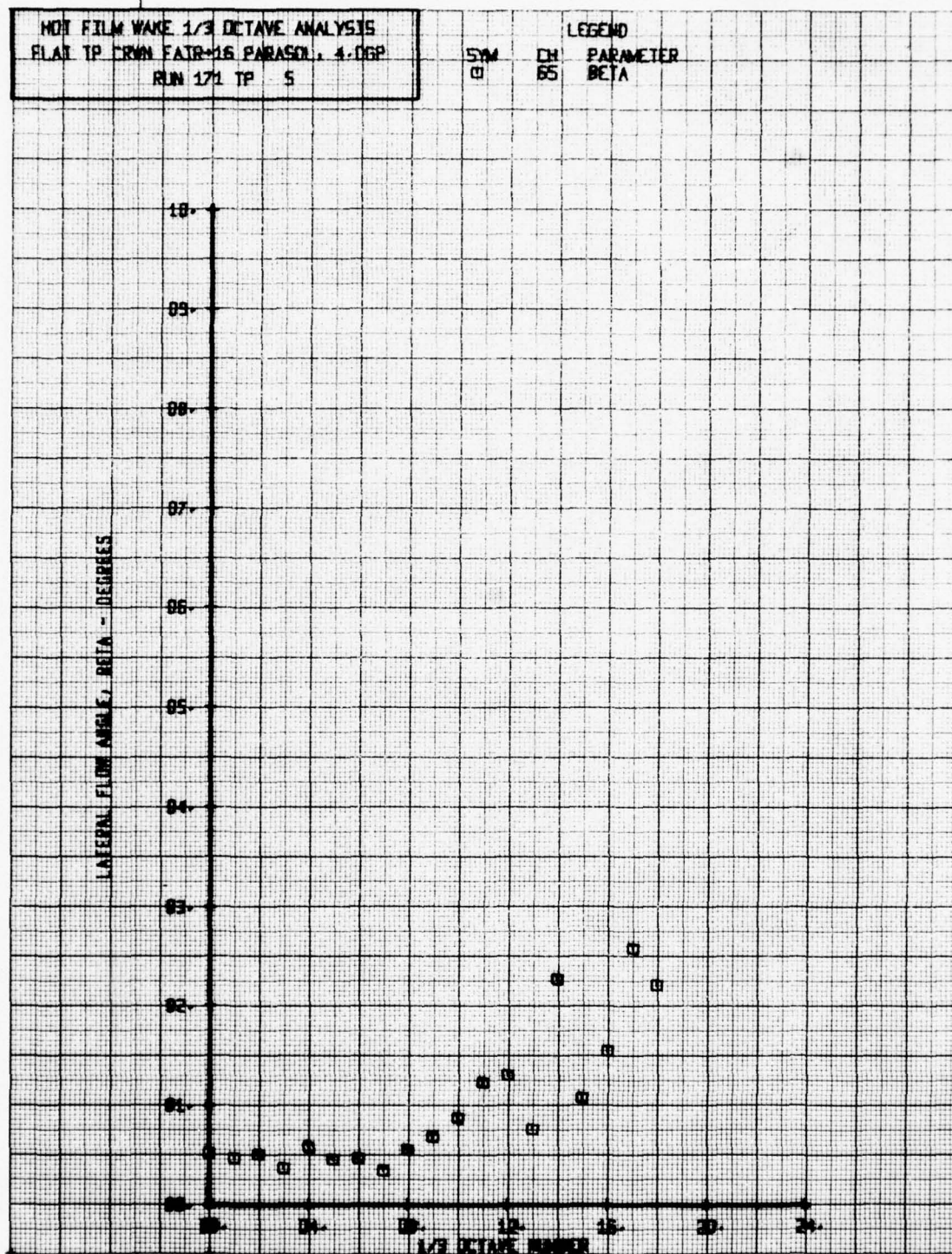
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRWN FAIR-16 PARASOL, 4-DGP
 RUN 171 TP 4

SYN CH PARAMETER
 0 65 BETA



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRWN FAIR-16 PARASOL, 4-DGP
 RUN 171 TP 5

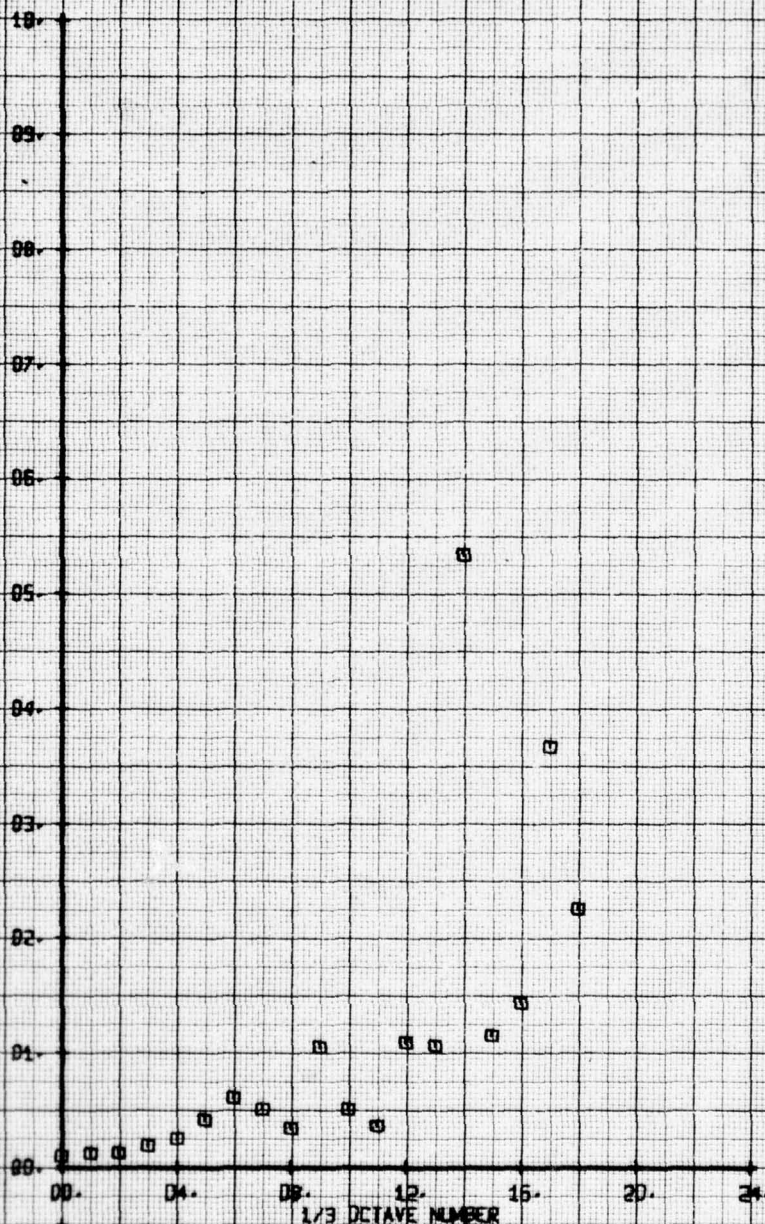
LEGEND
 5MM CH PARAMETER
 0 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP RUN FATR-16 PARASOL, 4-DGP
 RUN 171 TP 6

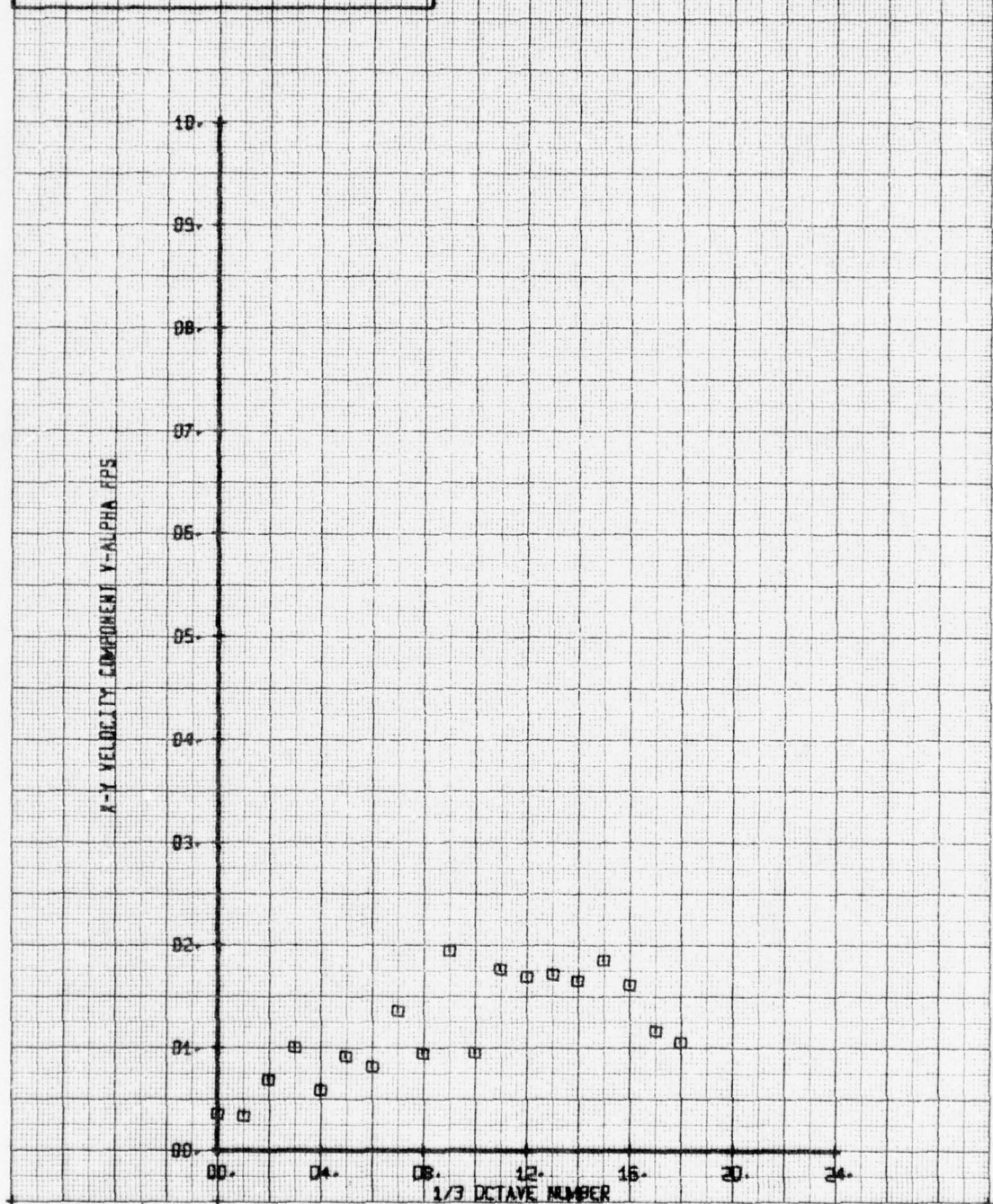
SYM	CH	PARAMETER
□	55	BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRWN FAIR-16 PARASOL, 4-06P
 RUN 172 TP 2

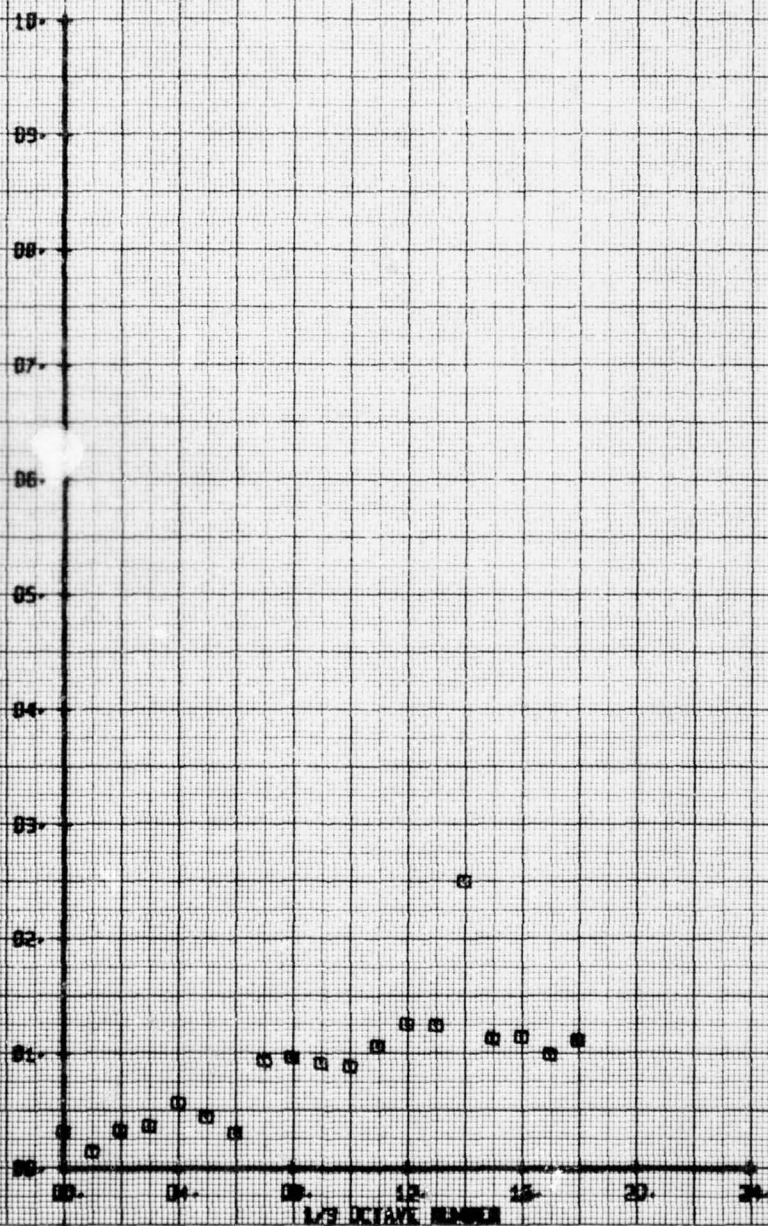
LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP FROM FAIR-16 PARASOL, 4-DEP
 RUN 171 TP 3

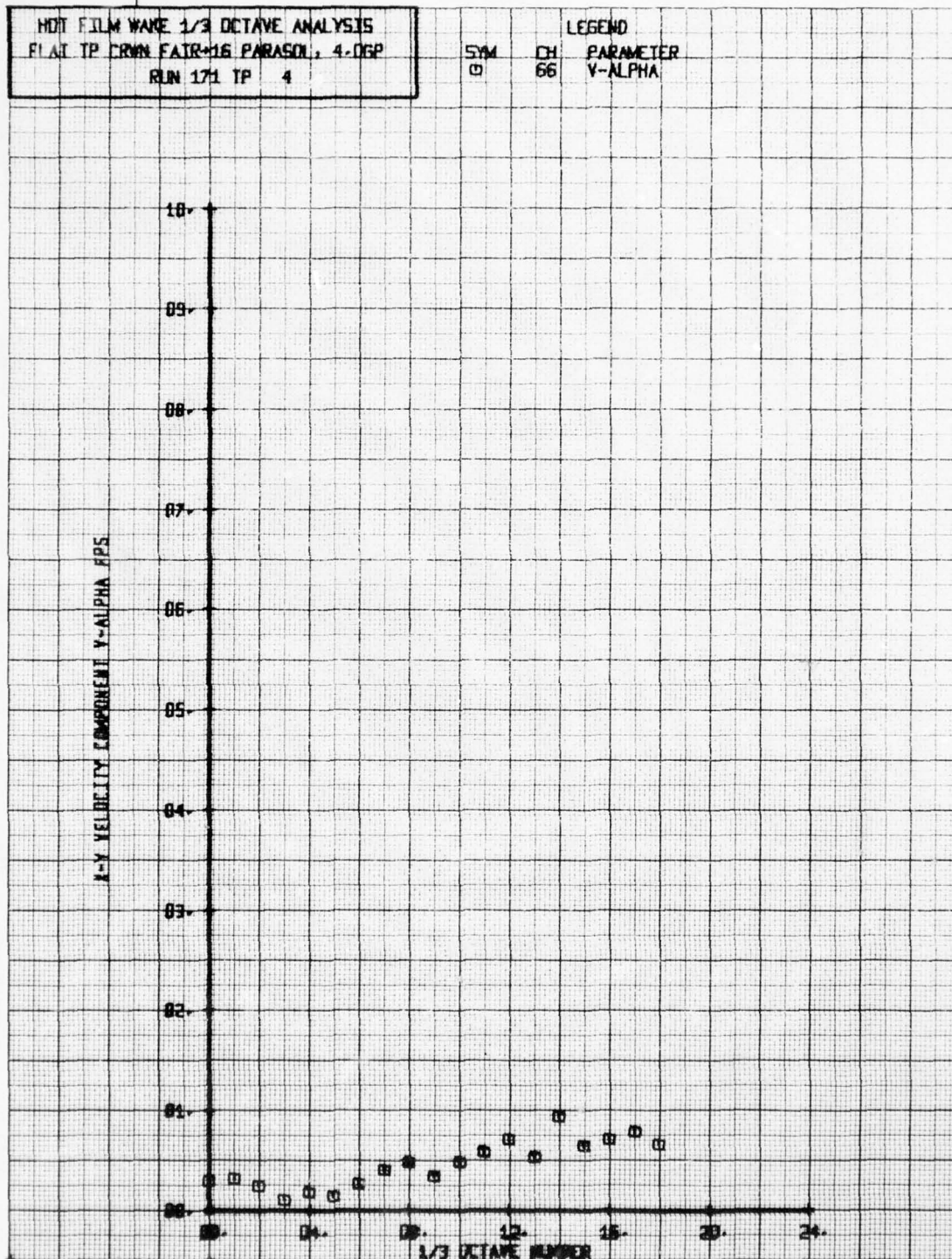
LEGEND
 CH 66
 PARAMETER
 Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA FPS



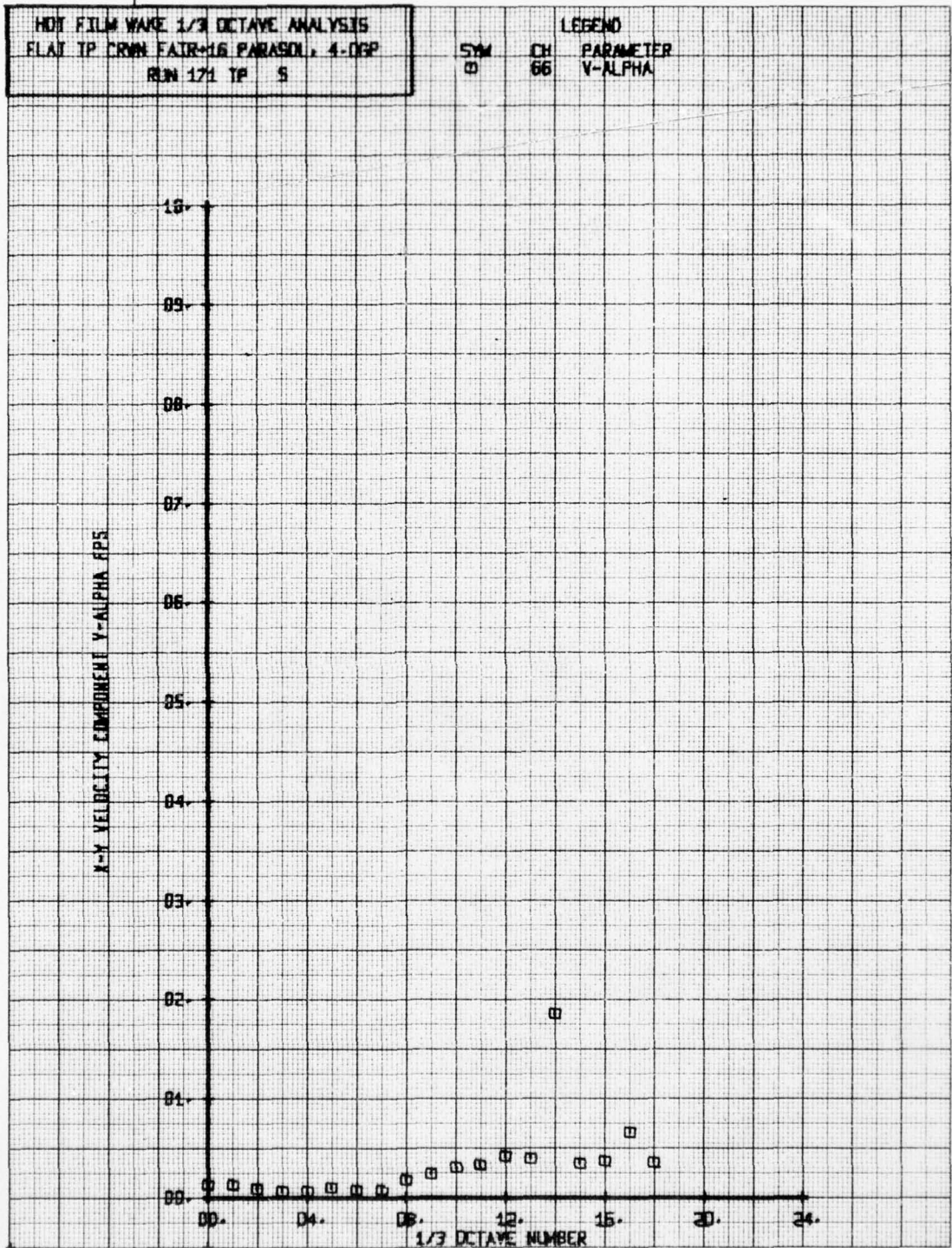
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CROWN FAIR-16 PARASOL, 4-06P
 RUN 171 TP 4

LEGEND	
SYM	CH
□	66
PARAMETER	
Y-ALPHA	



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CROWN FAIR-16 PARASOL, 4-06P
 RUN 171 TP S

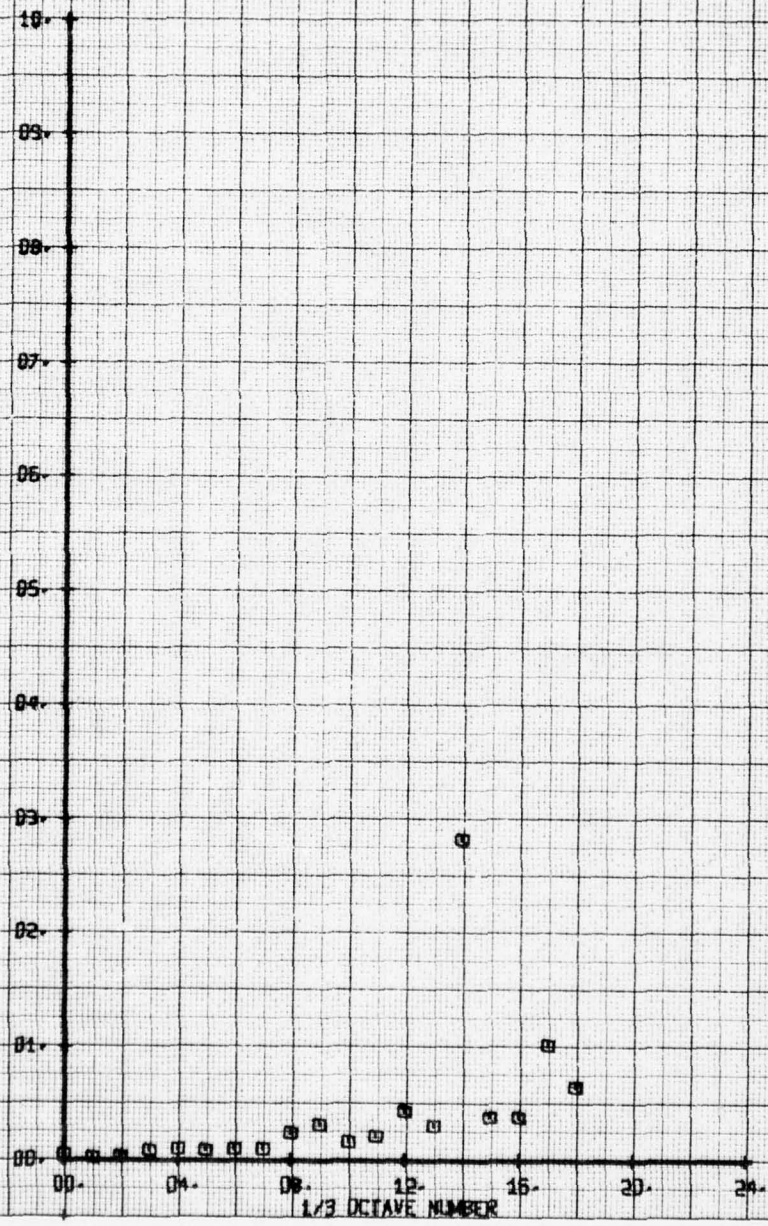
LEGEND		
SYM	CH	PARAMETER
□	66	V-ALPHA



HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 CLASS 1P CRWN FAIR-16 PARASOL, 4-06P
 RUN 171 TP 6

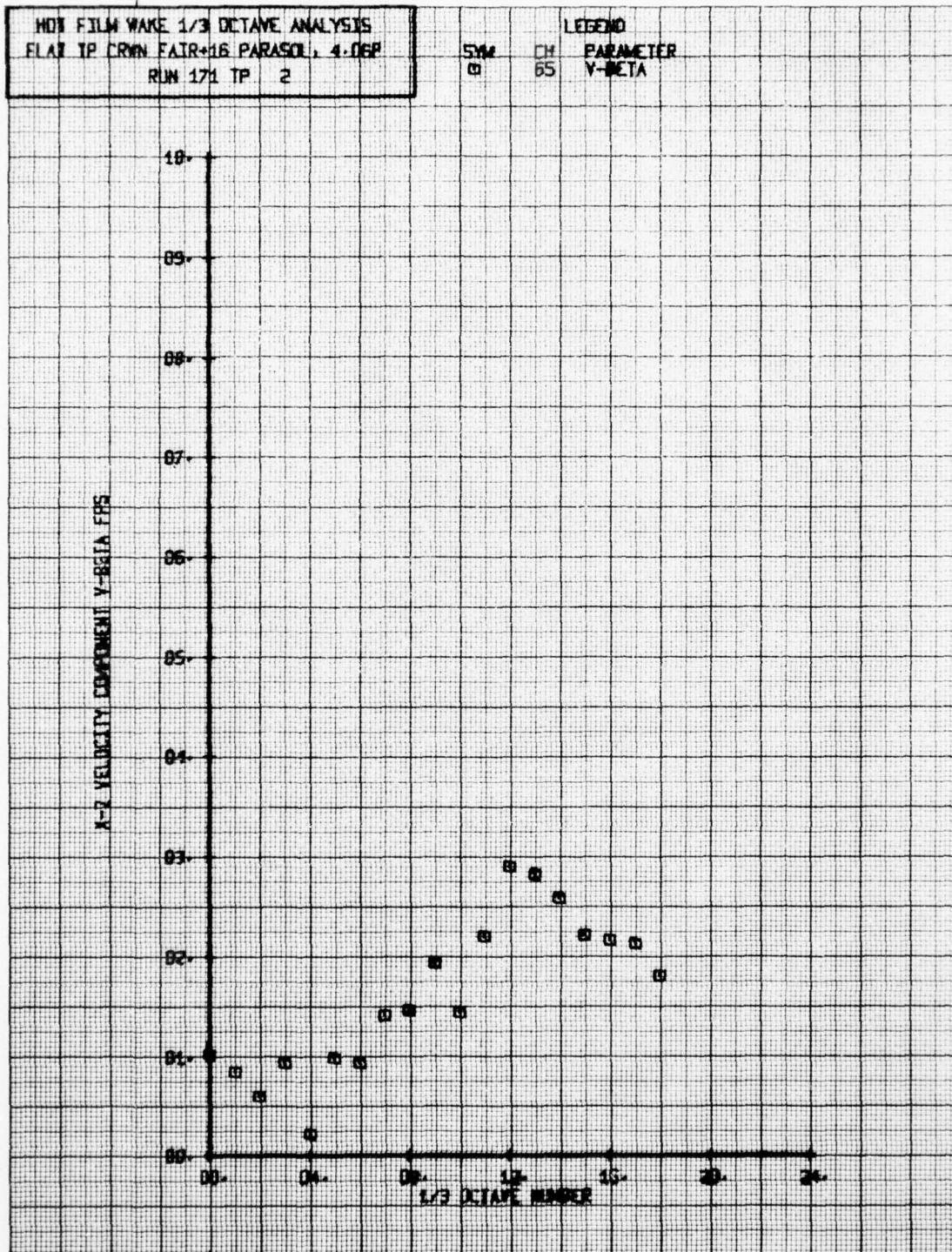
LEGEND
 SWM CH PARAMETER
 0 56 V-ALPHA

A-Y VELOCITY COMPONENT V-ALPHA FPS



MOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRYN FAIR-16 PARASOL, 4-06P
 RUN 171 TP 2

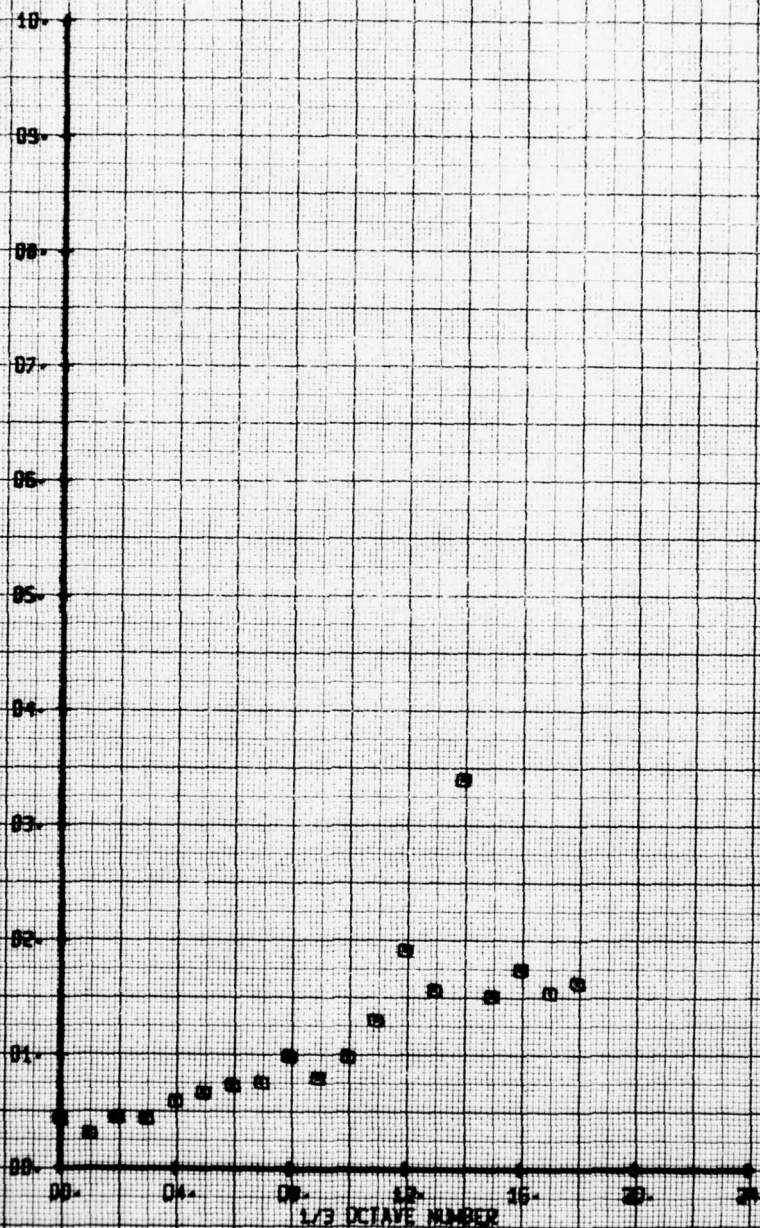
SIM	CH	PARAMETER
0	65	Y-BETA

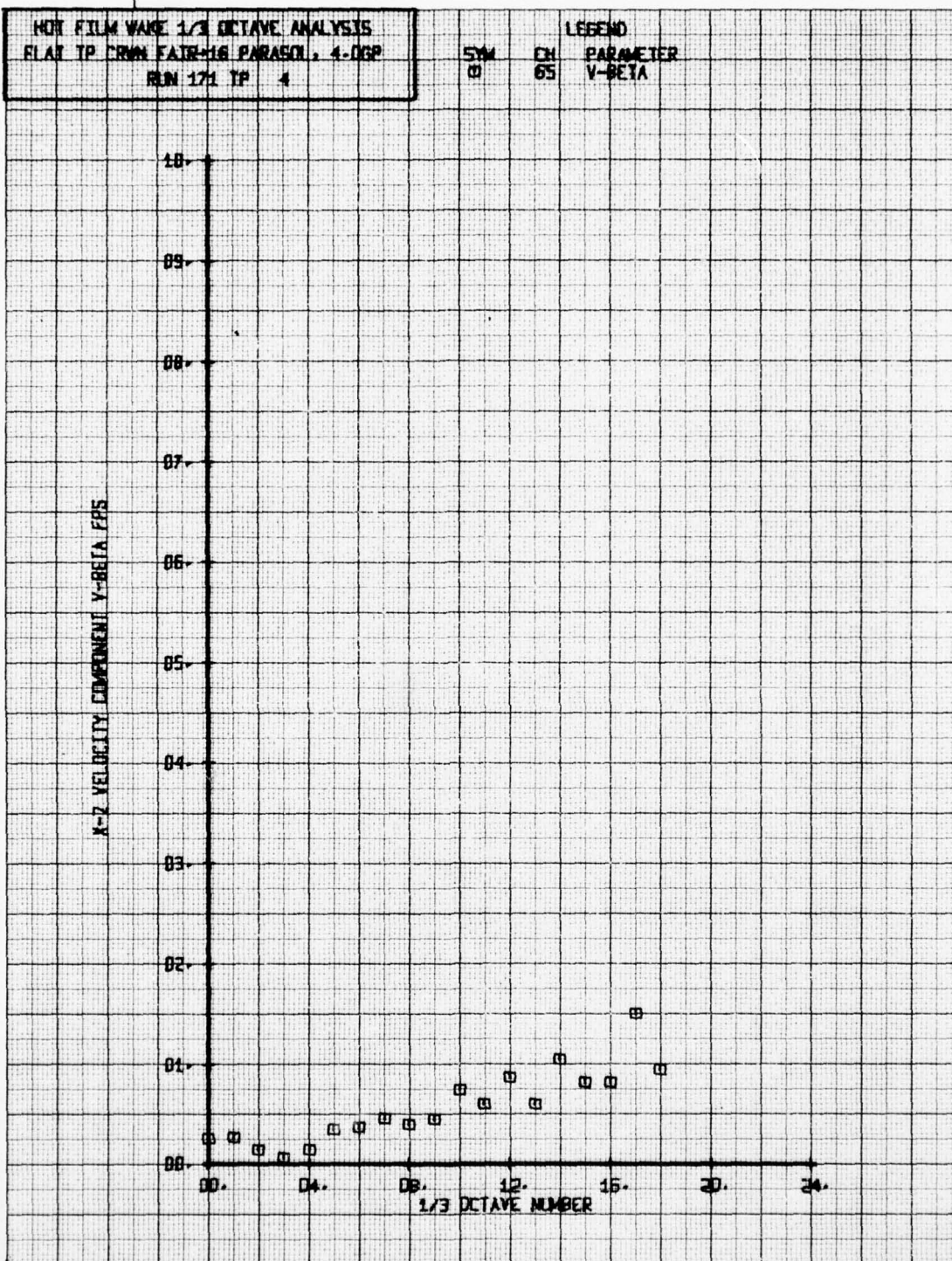


MOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CROWN FAIR-16 PARASOL, 4.06P
 RUN 171 TP 3

SYM	CH	PARAMETER
0	65	V-BETA

X-2 VELOCITY COMPONENT V-BETA EPS

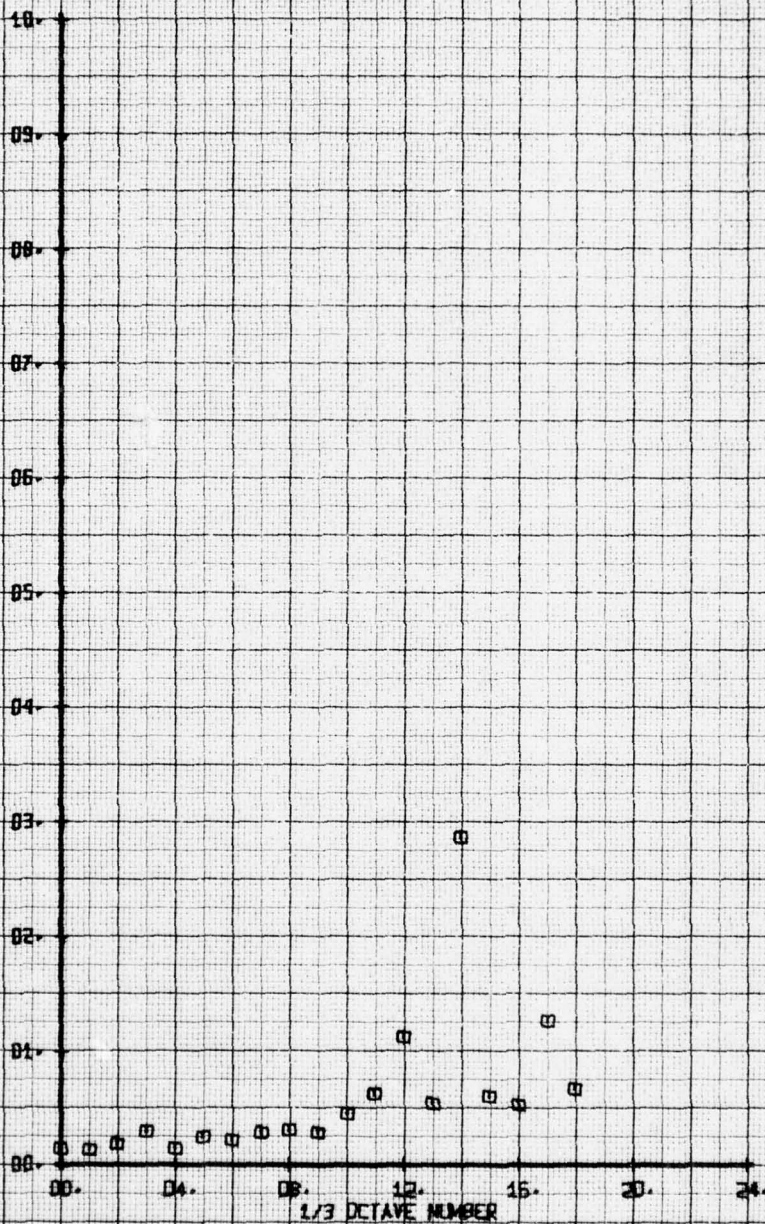




MOI FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP FROM FATH-16 PARASON, 4-06P
 RUN 171 TP 5

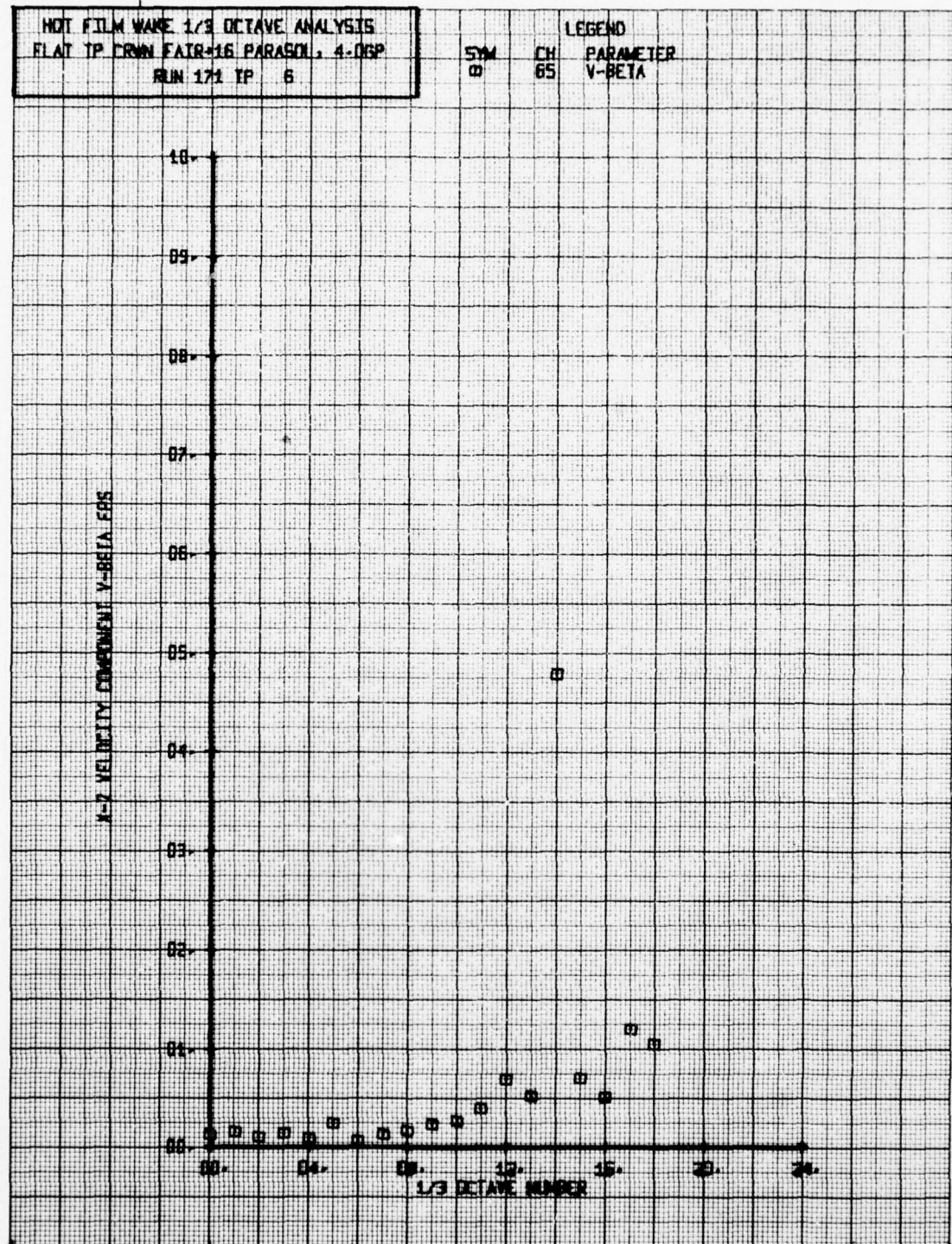
SYN CH
 0 05
 LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FLAT TP CRWN FAIR-16 PARABOL, 4-06P
 RUN 171 TP 6

SYM	CH	LEGEND
0	65	PARAMETER V-BETA



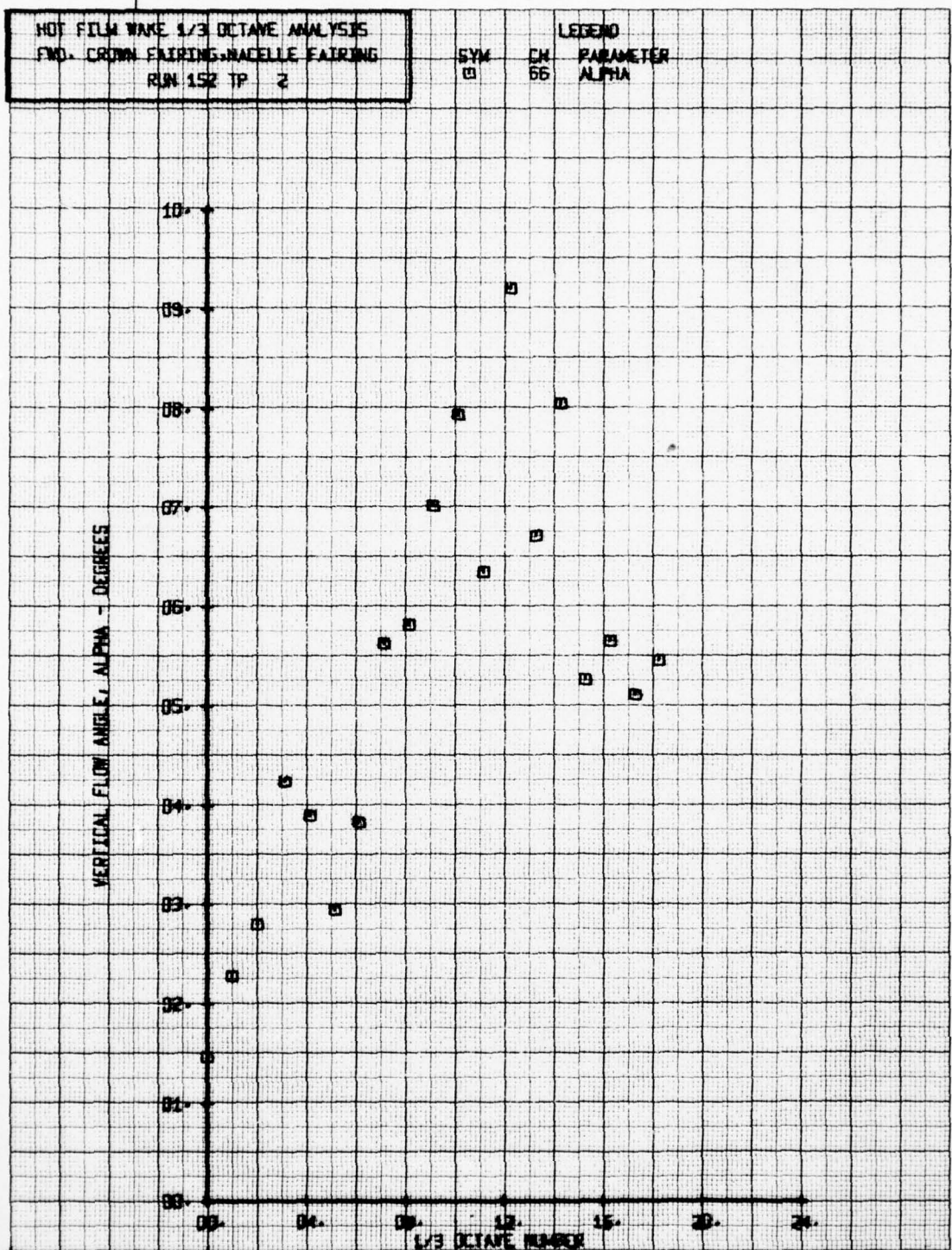
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD. CROWN FAIRING, NOZZLE FAIRING
 RUN 152 TP 2

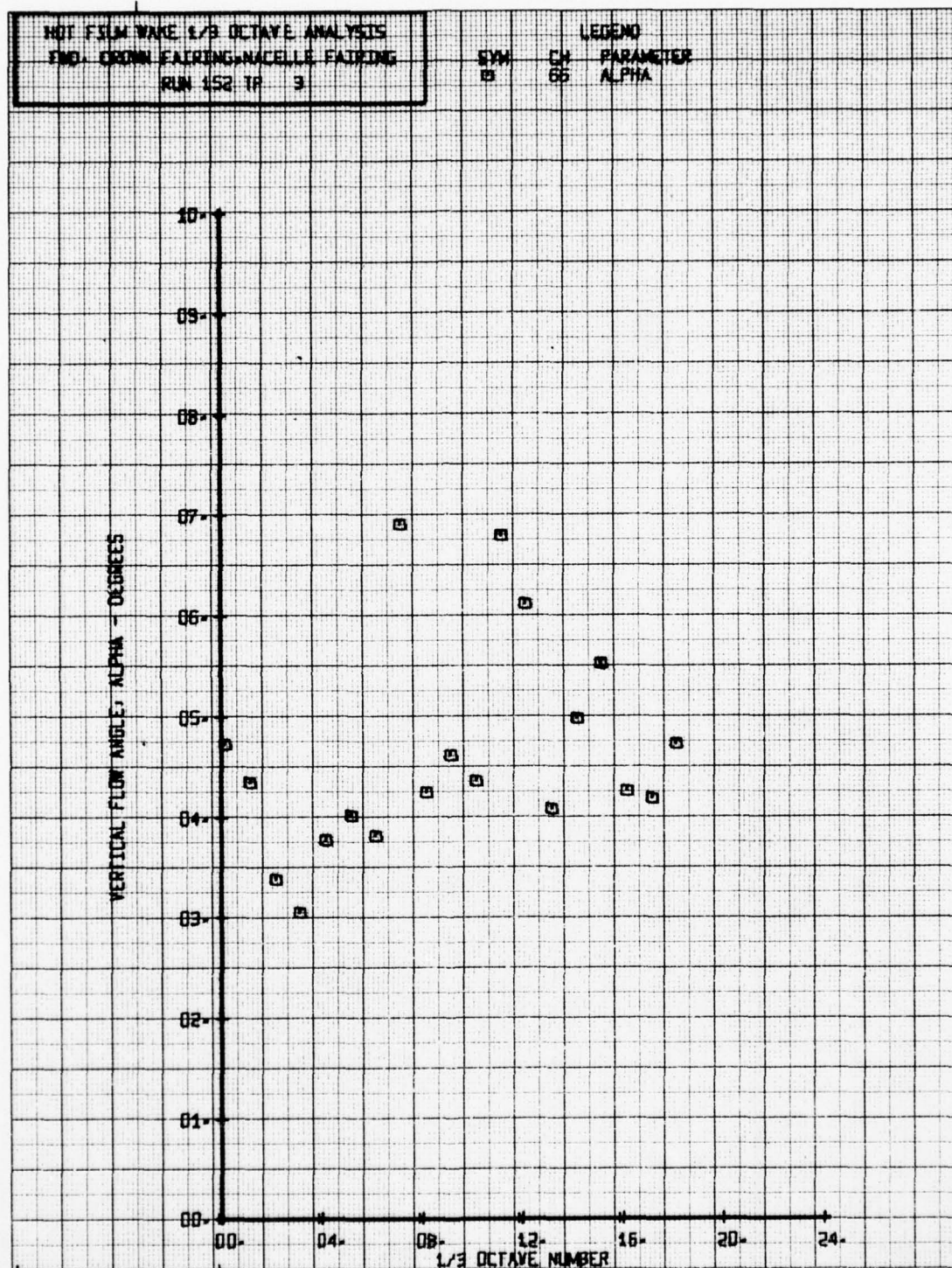
SYM
 □

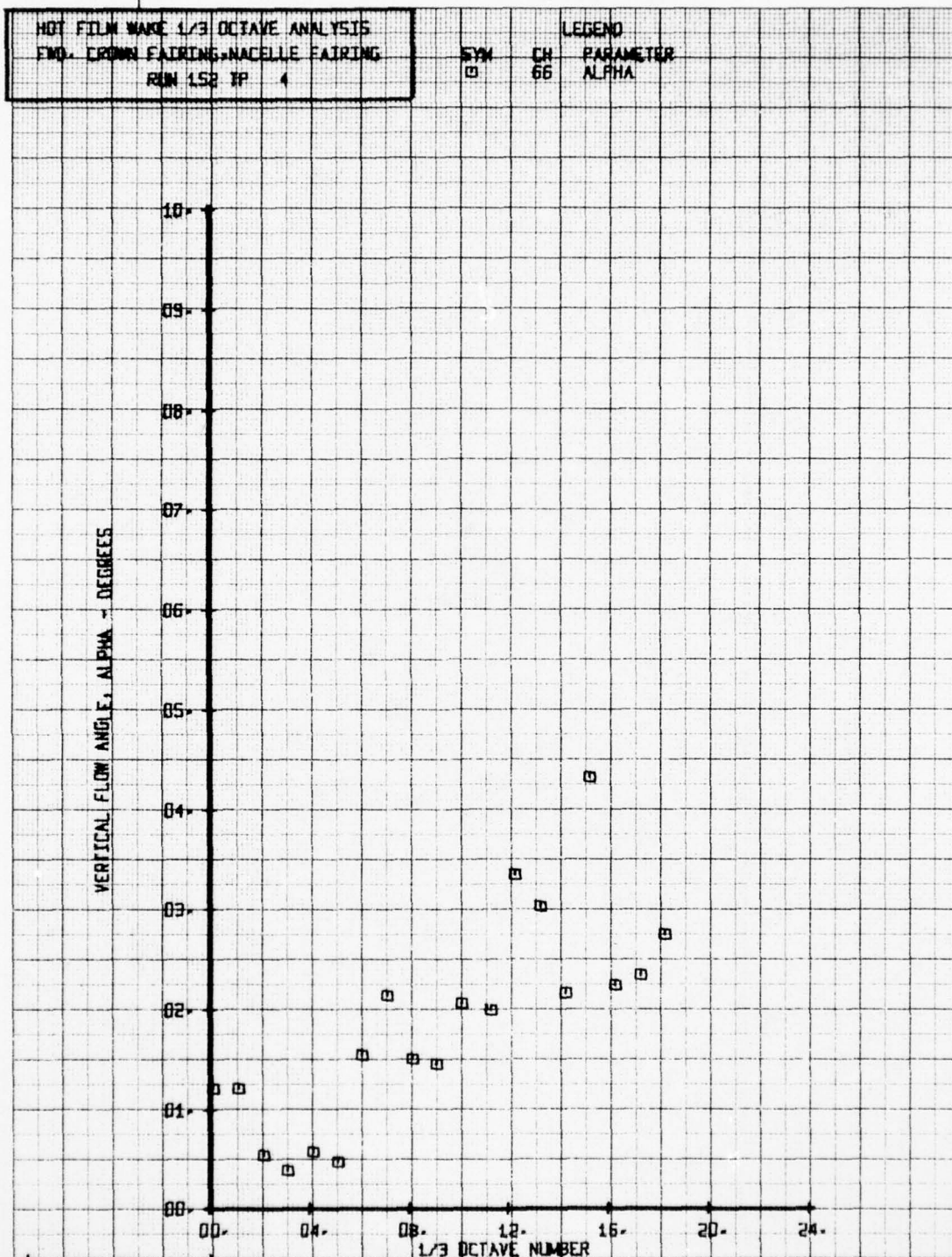
CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

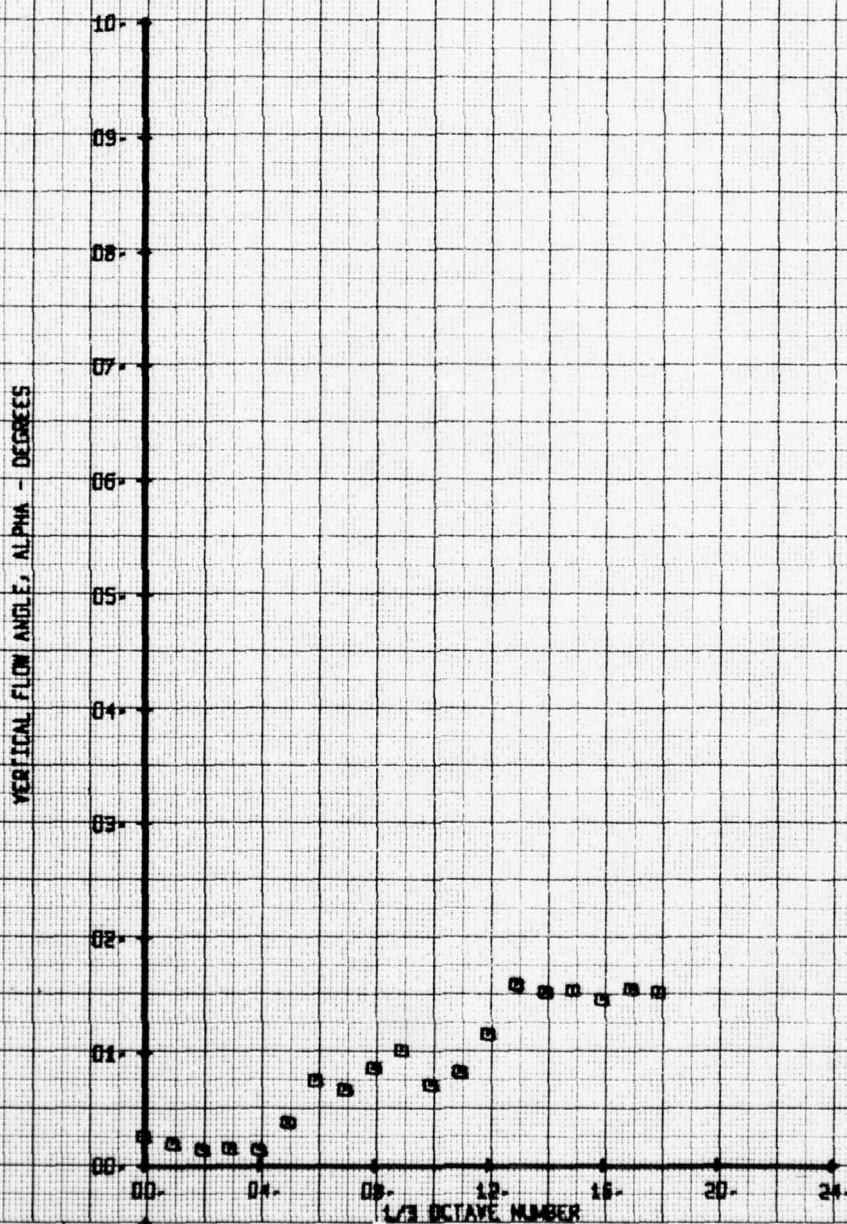






HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD CROWN FAIRING, NACELLE FAIRING
 RUN 152 TP 5

SYN CH LEGEND
 □ 66 PARAMETER
 ALPHA

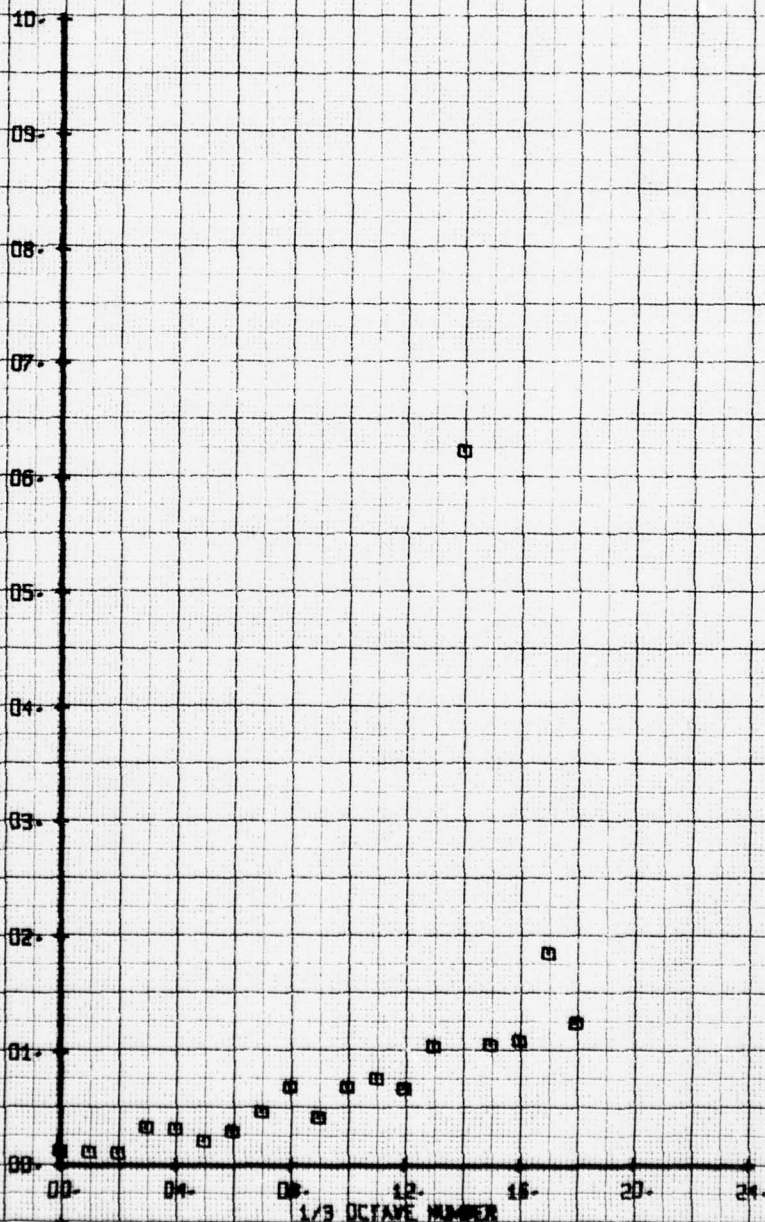


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD. CROWN FAIRING, NACELLE FAIRING
 RUN 152 TP 6

SYM
 □

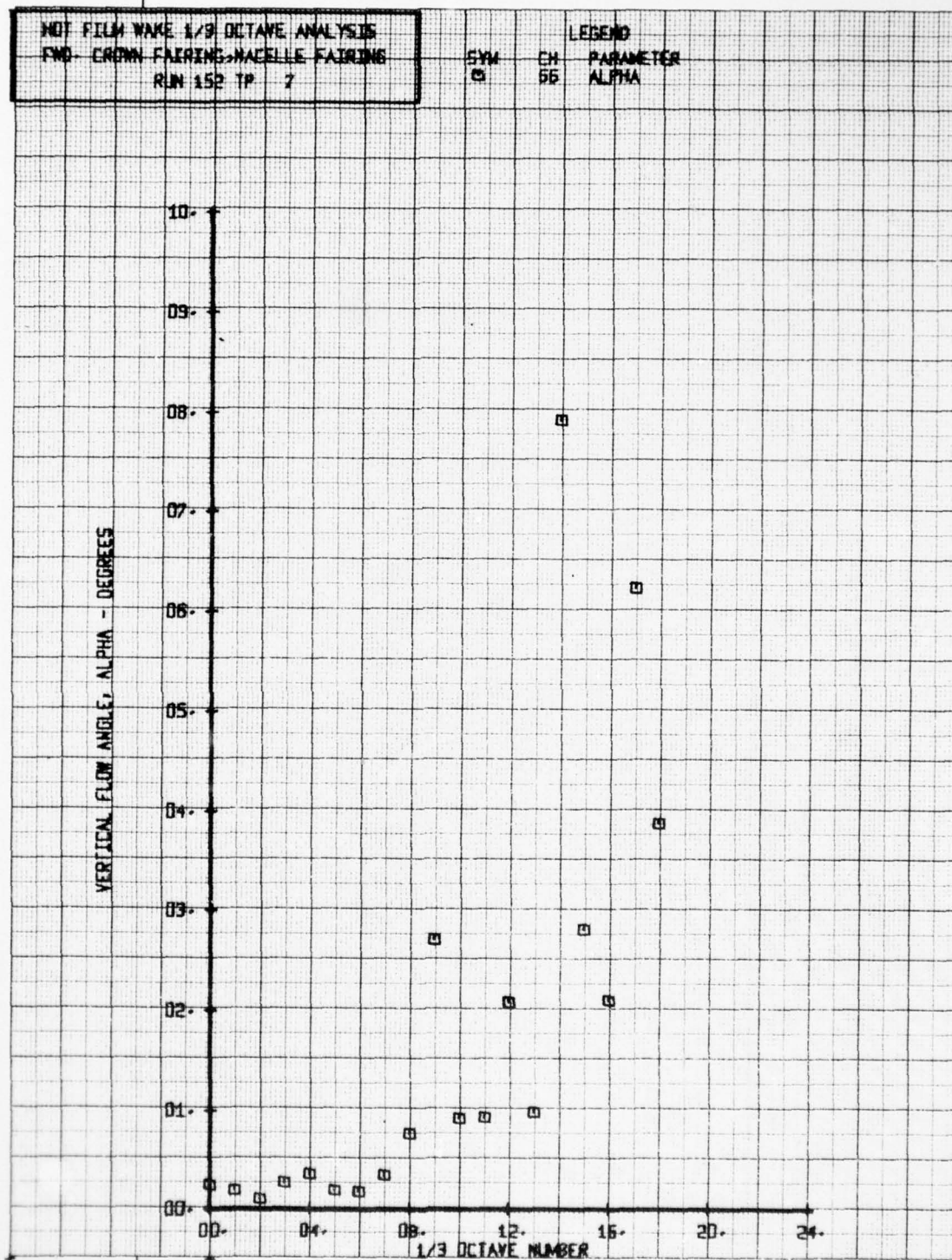
LEGEND
 CH 55
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD- CROWN FAIRING-NOSE FAIRING
 RUN 152 TP 7

LEGEND
 CH PARAMETER
 55 ALPHA



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF1--ETC(U)
SEP 78 P F SHERIDAN

F/G 1/3

DAAJ02-77-C-0020

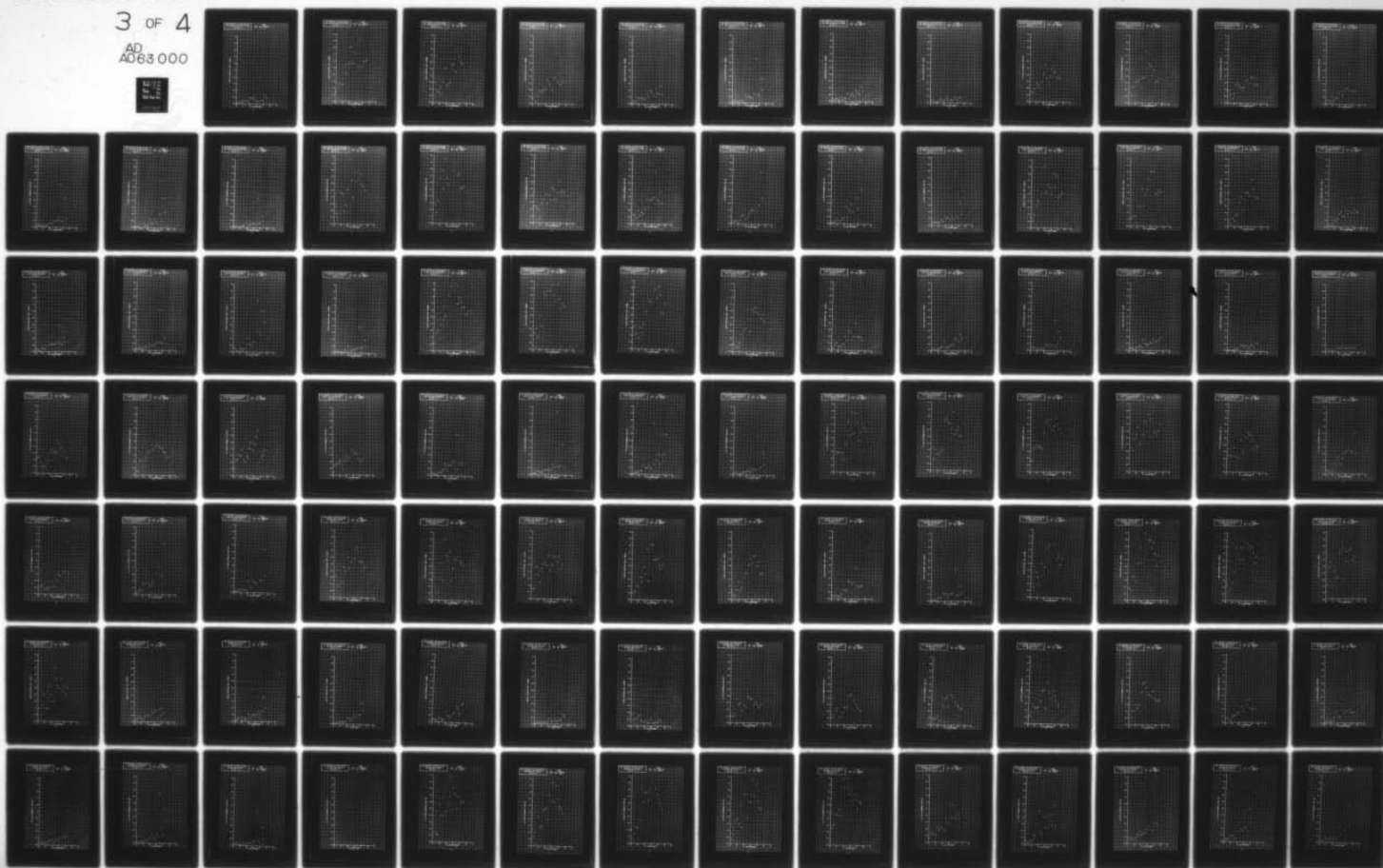
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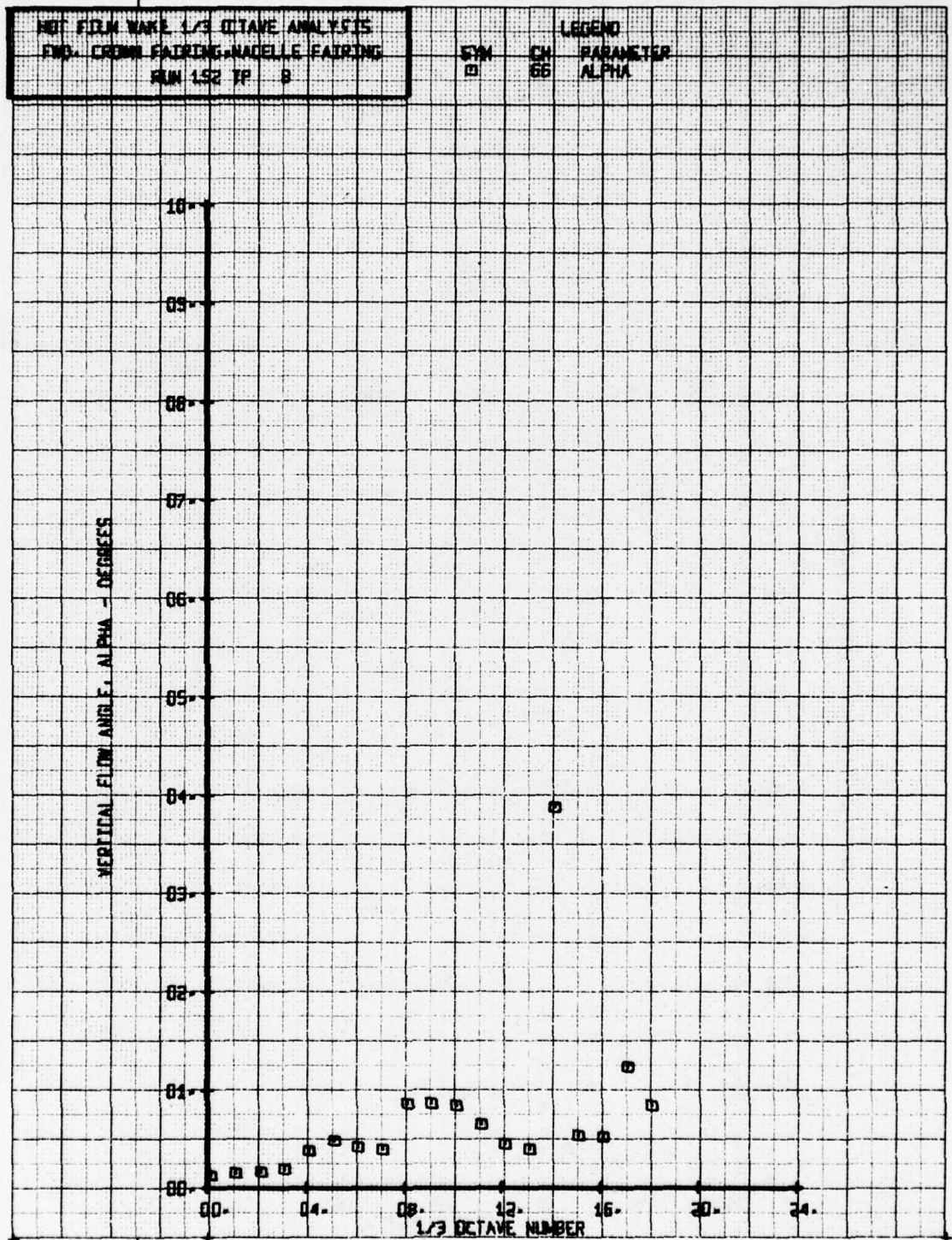
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3 OF 4

AD
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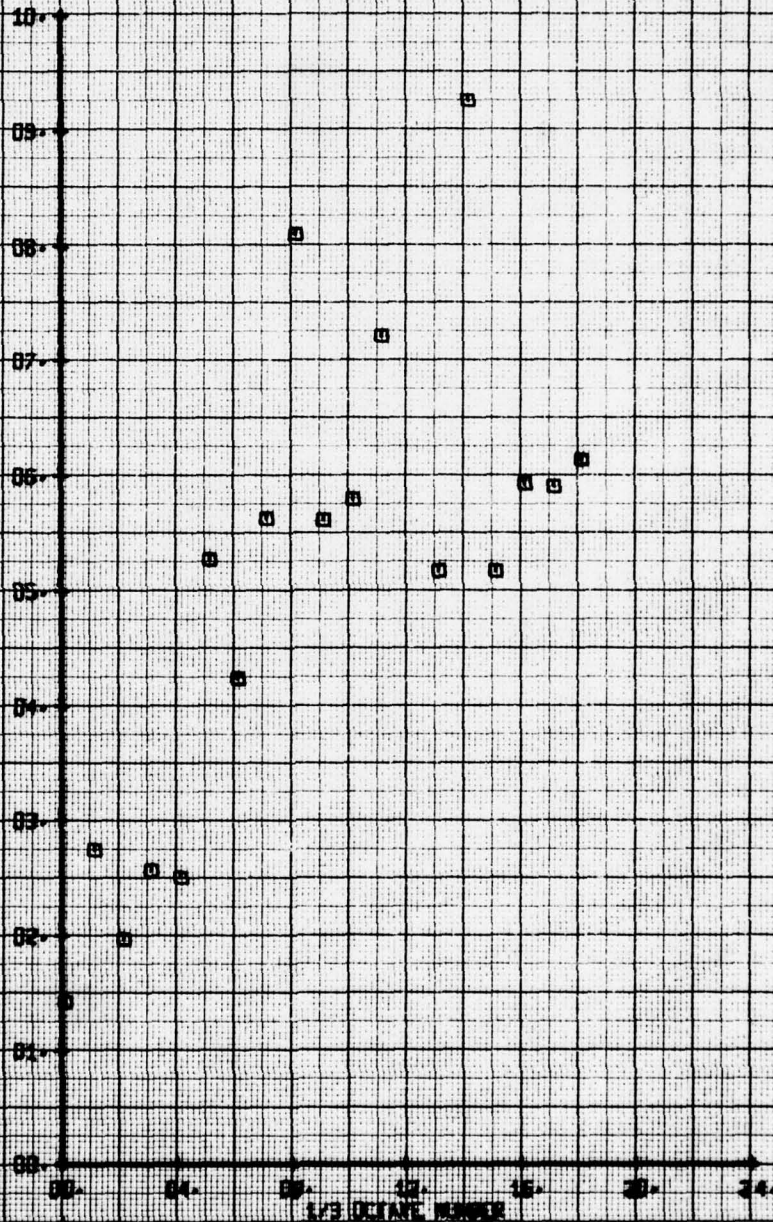


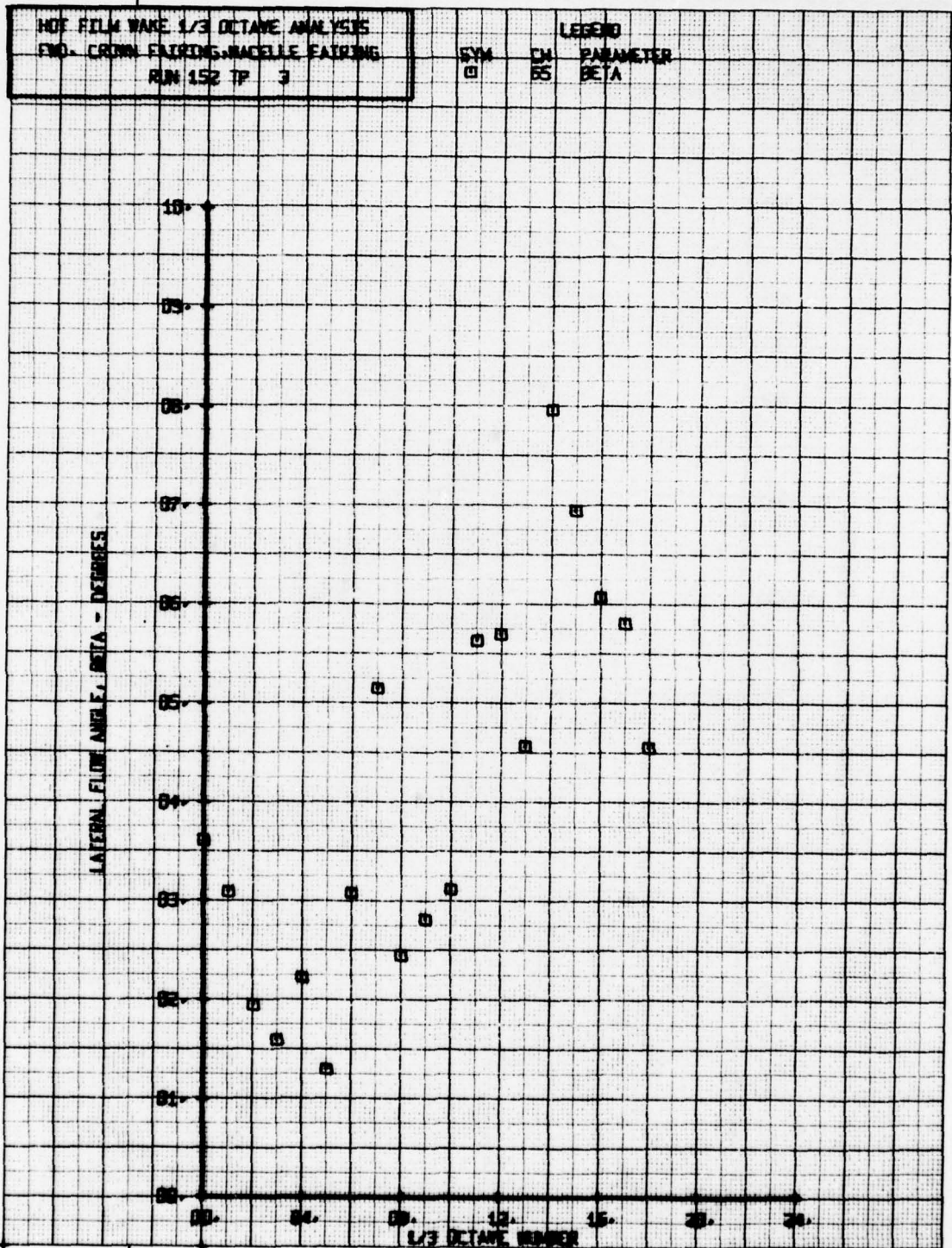


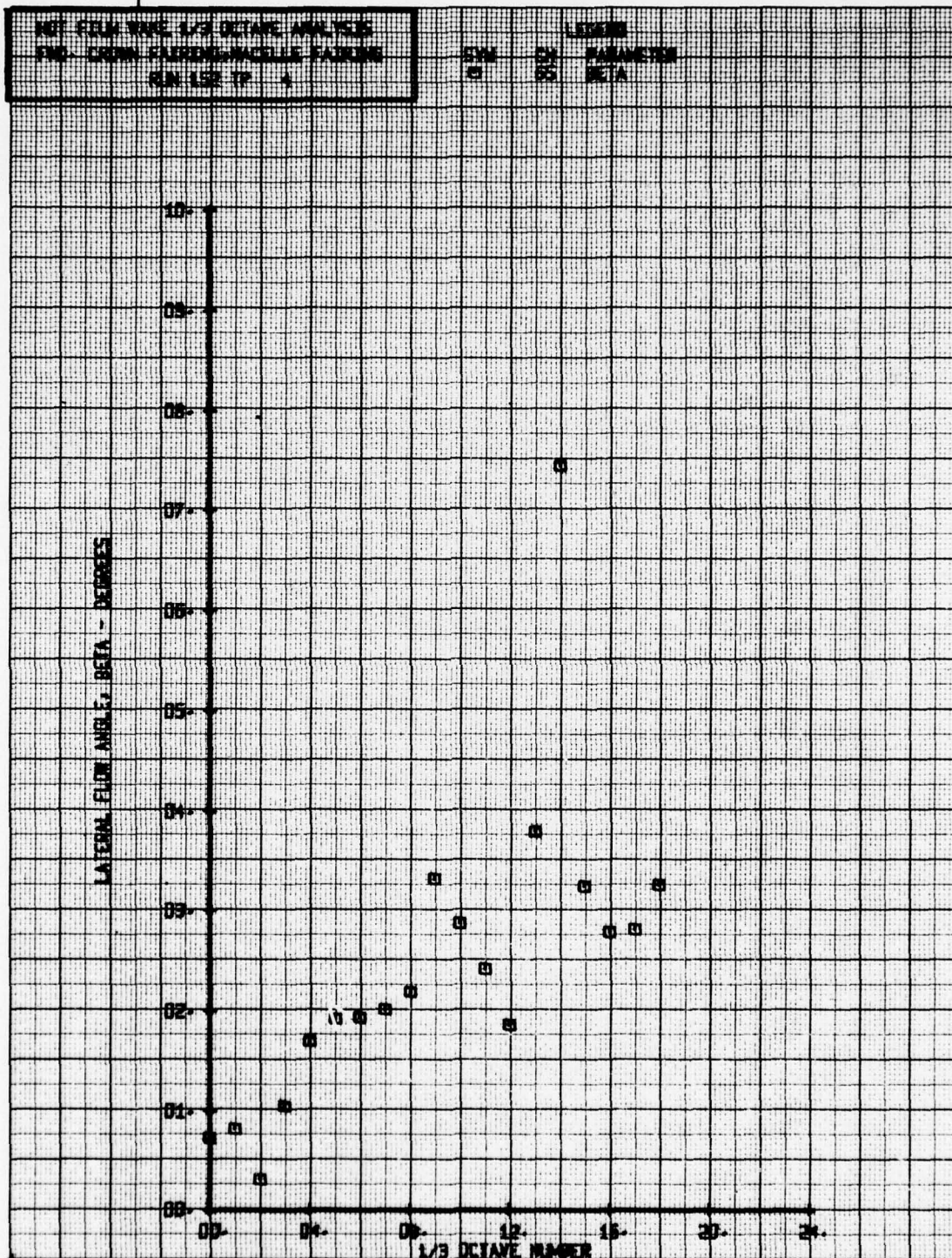
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD. CROWN FAIRING, NOZZLE FAIRING
 RUN 152 TP 2

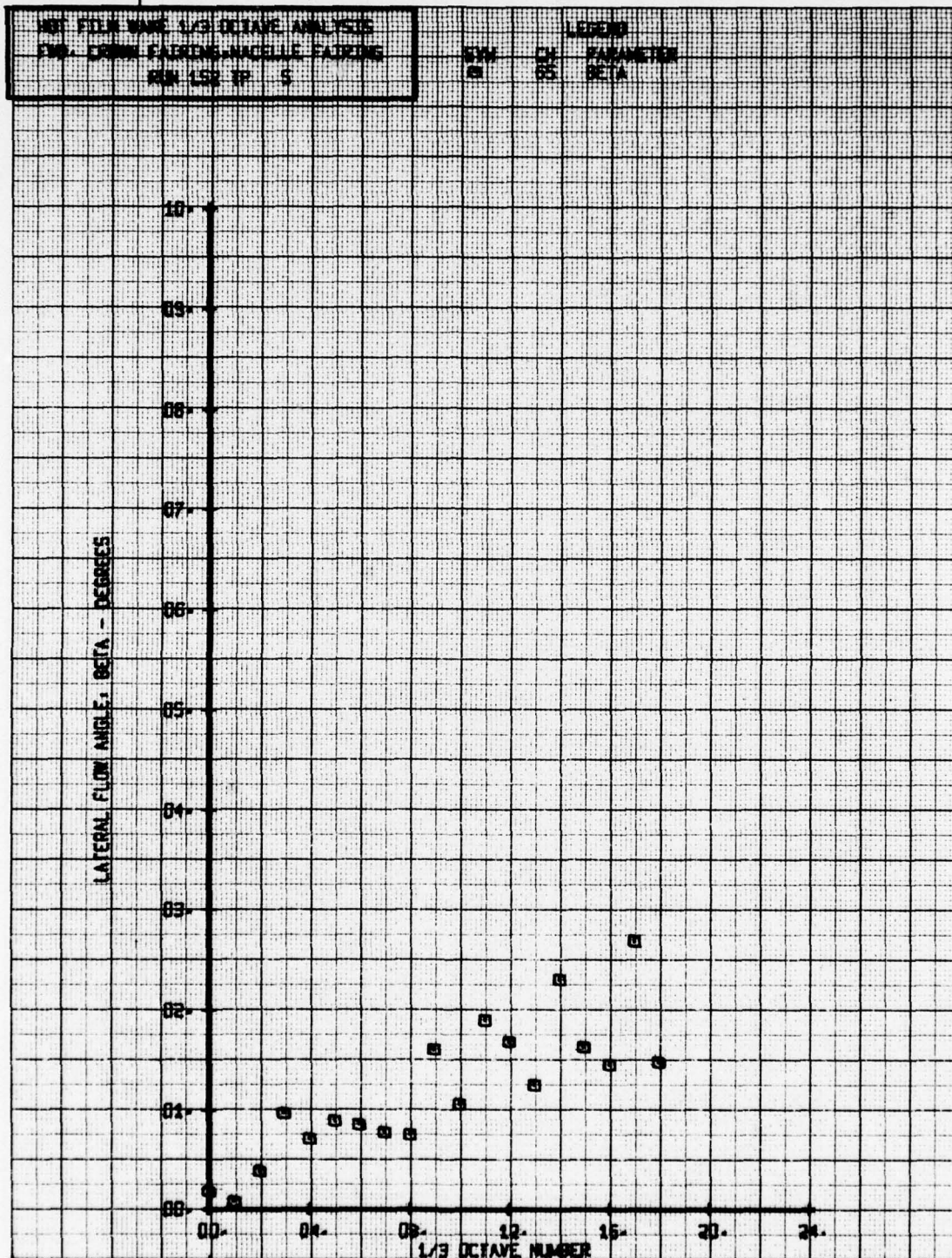
LEGEND
 SYM DN PARAMETER
 □ 05 BETA

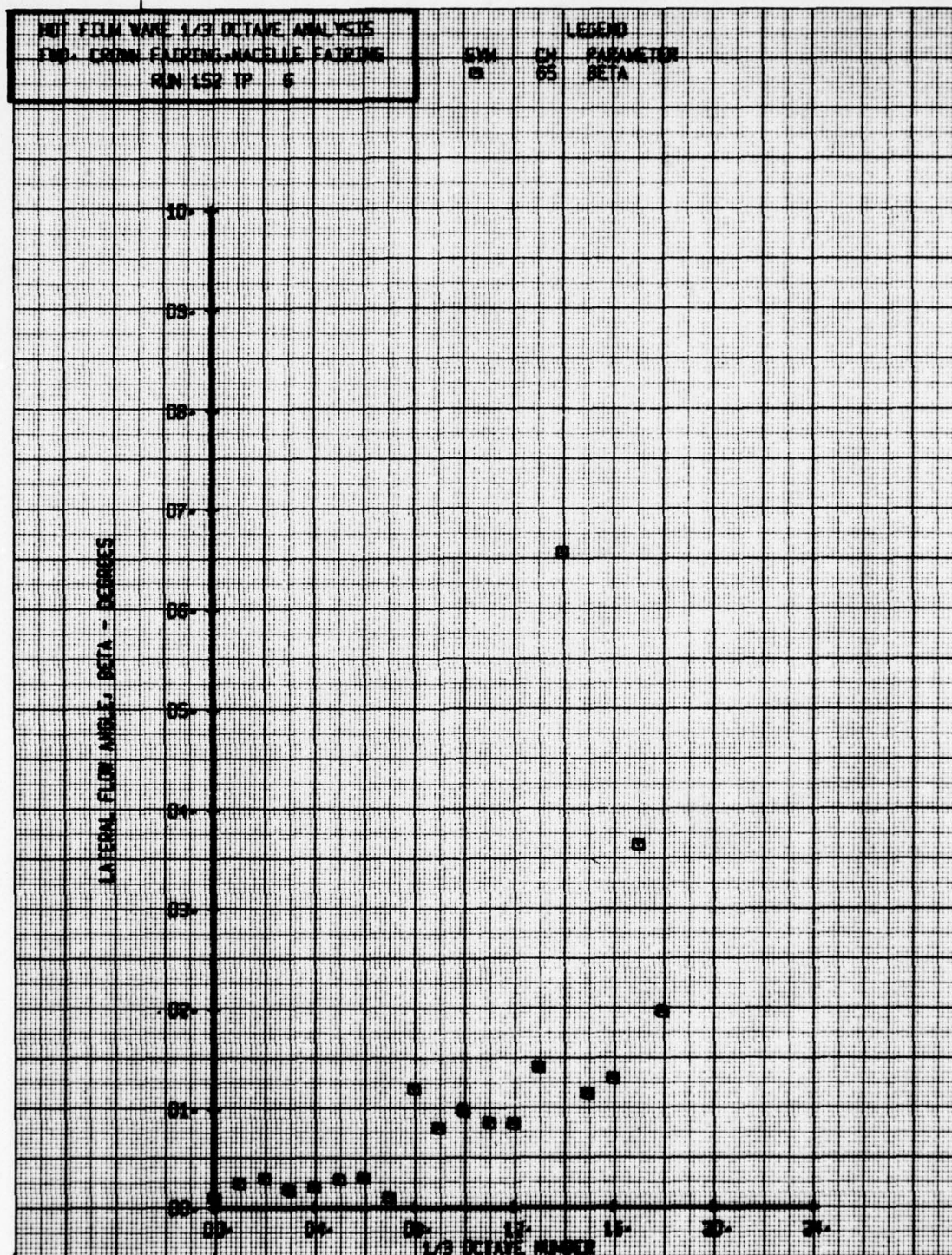
LATERAL FLOW ANGLE, BETA - DEGREES





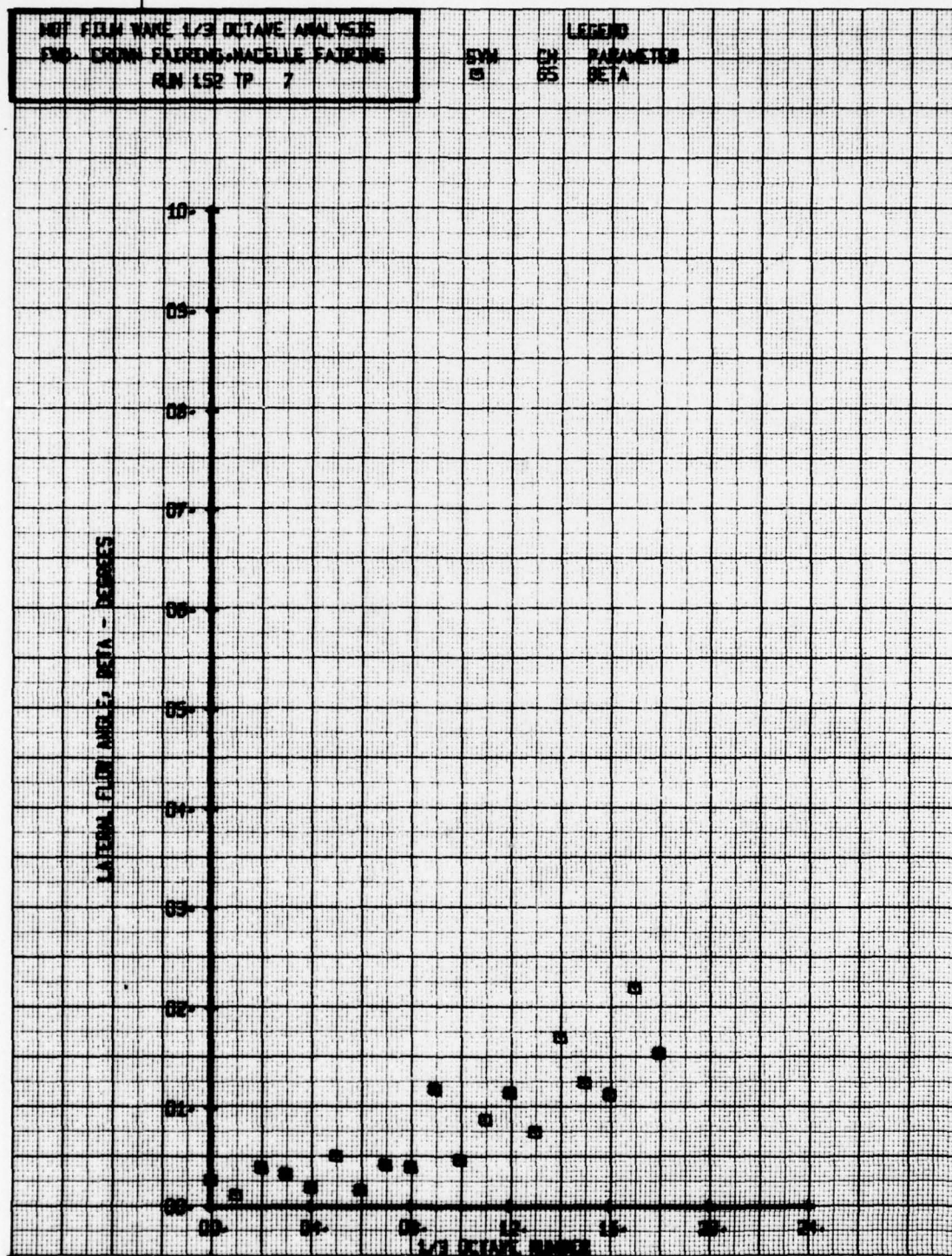






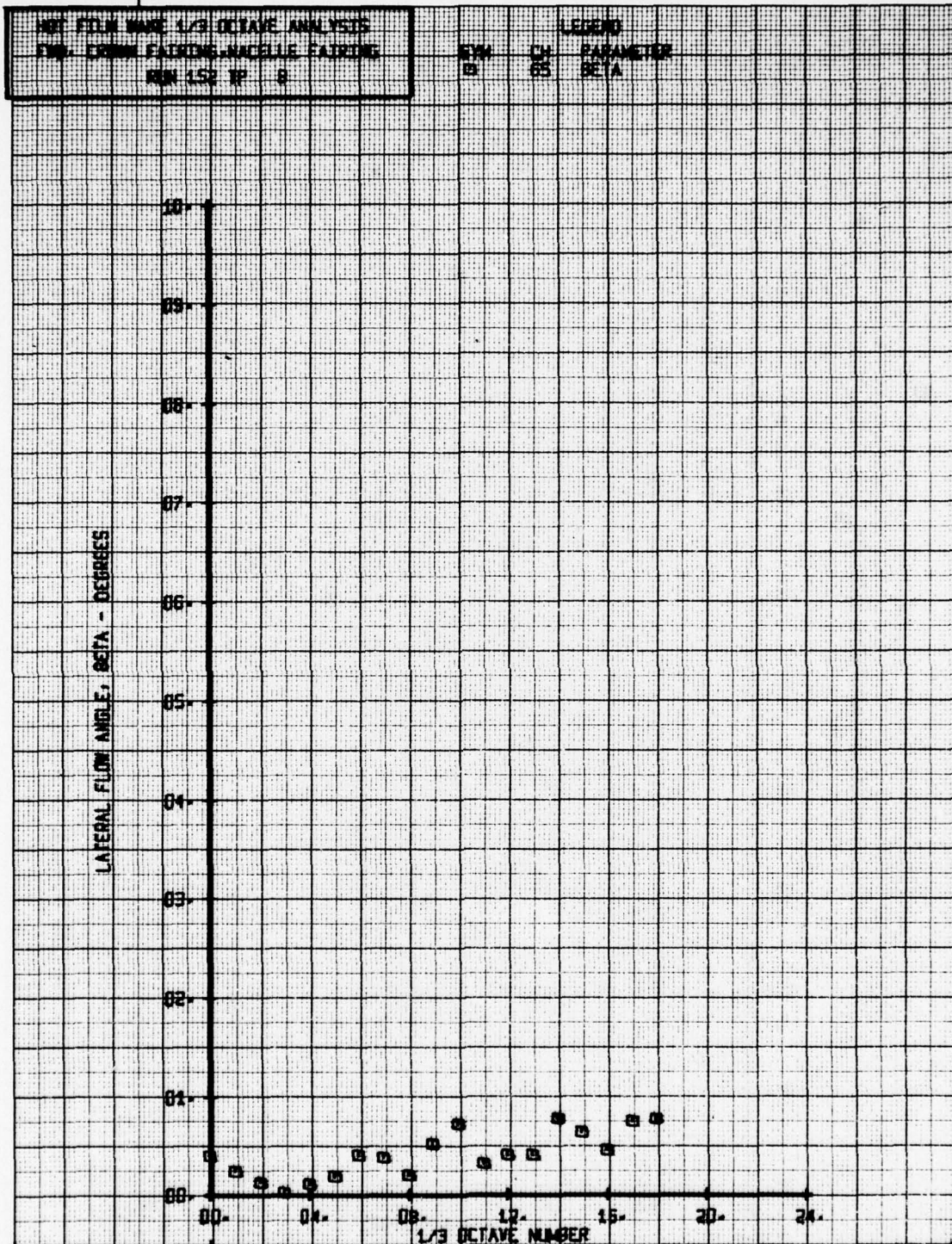
NOI FILM WAVE 1/3 OCTAVE ANALYSIS
 FNO- CROWN FAIRING-NACELLE FAIRING
 RUN 152 TP 7

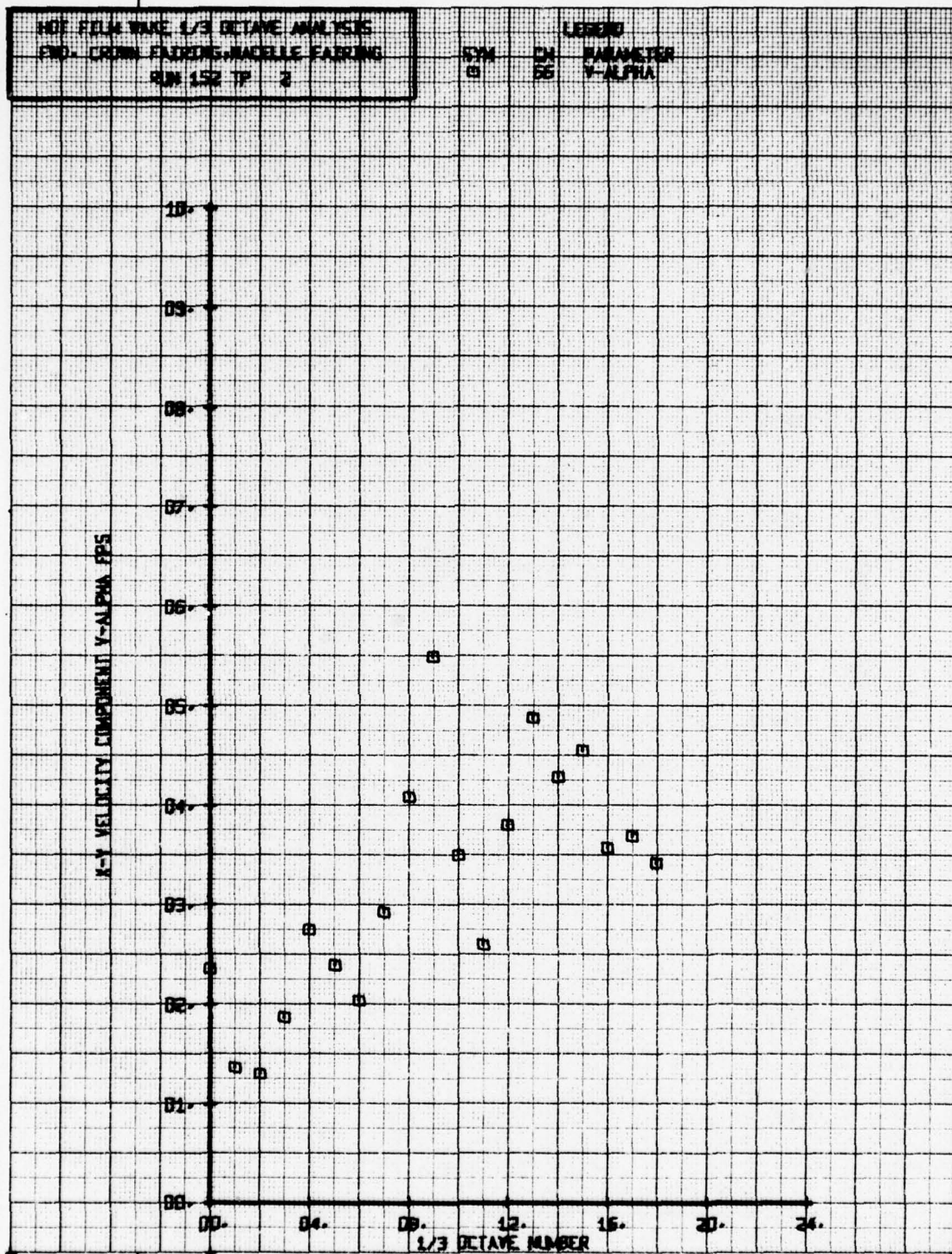
SYN CH
 65 65
 PARAMETER
 BETA



NET FILM WAVE 1/3 OCTAVE ANALYSIS
 FWD. FROM FAIRING, NACELLE FAIRING
 NON-LSZ IF 8

LEGEND
 CH-1 PARAMETER
 CH-2 BETA





HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD. CROWN FAIRING NOZZLE FAIRING
 RUN 152 TP 3

SYM
 □

LEGEND
 ON 56
 PARAMETER
 V-ALPHA

1/3 VELOCITY COMPONENT V-ALPHA FPS

1/3 OCTAVE NUMBER

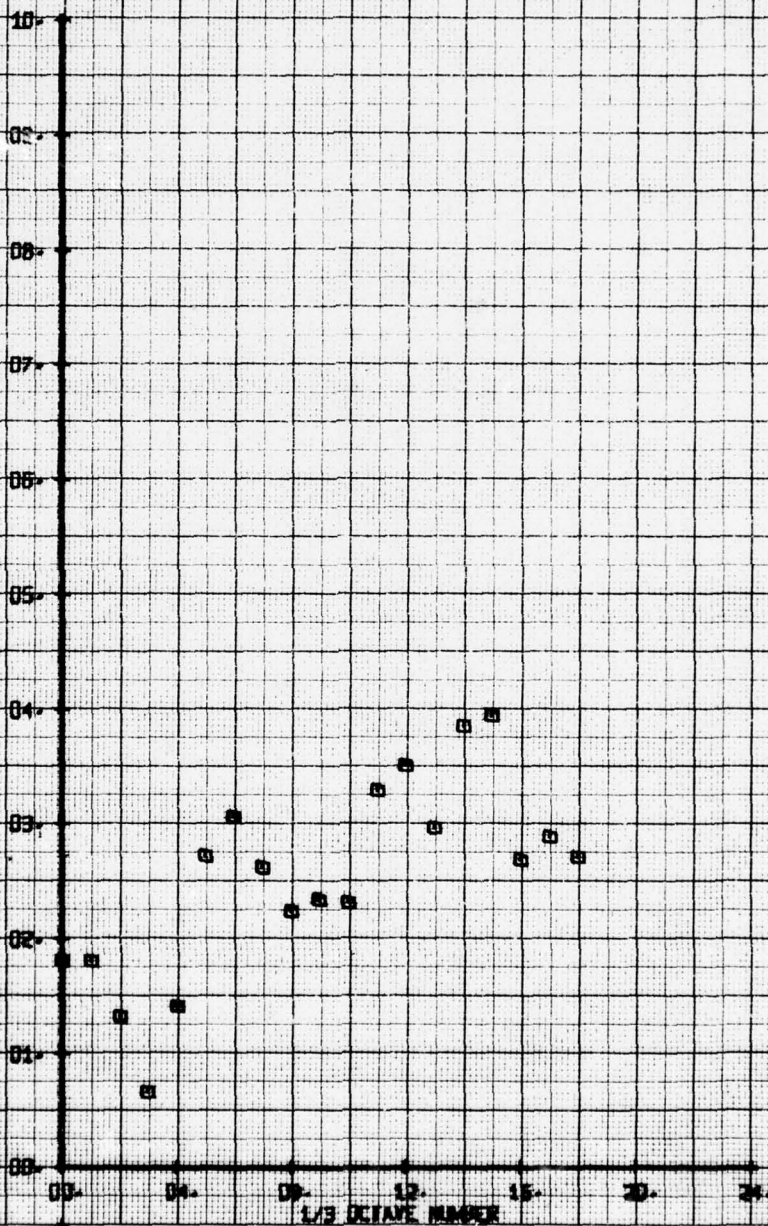
NOT FILM WARE 1/3 OCTAVE ANALYSIS
 FWD. CRWV FAIRING, NACELLE FAIRING
 RUN 152 TP 4

SYM
 5

CH
 56

LEGEND
 PARAMETER
 V-ALPHA

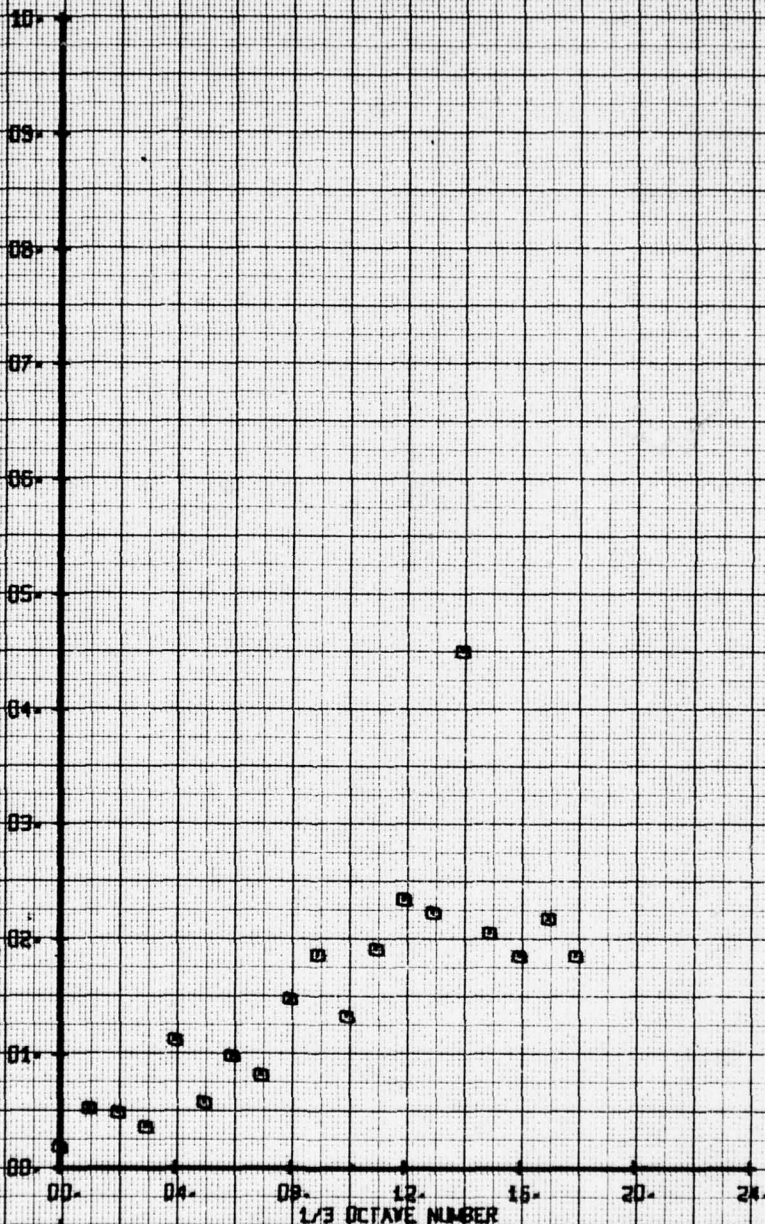
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD. CROWN FAIRING, NACELLE FAIRING
 RUN 152 XP 5

LEGEND
 CH PARAMETER
 56 Y-ALPHA

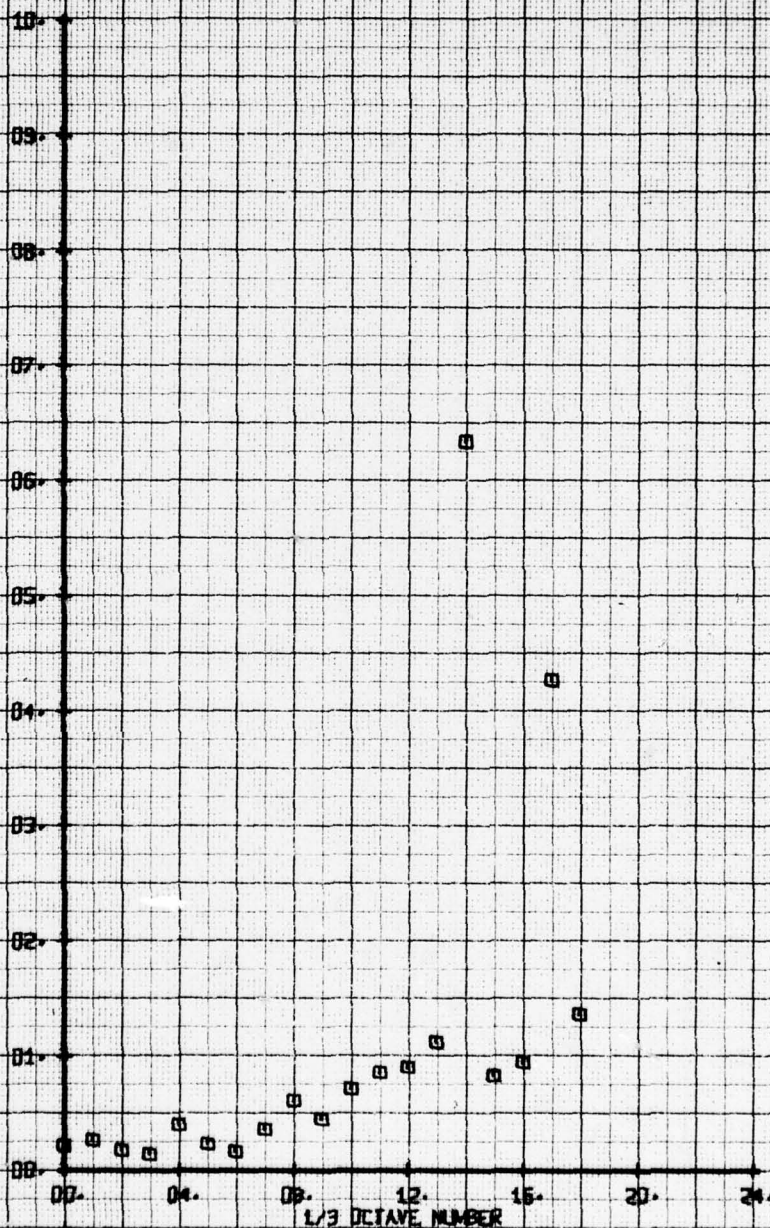
K-Y VELOCITY COMPONENT Y-ALPHA FPS



NOI FILM WAKE 1/3 OCTAVE ANALYSIS
 FNO. CROWN FAIRING, NOELLE FAIRING
 RUN 152 TP 6

LEGEND
 CH 55
 PARAMETER
 Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 END- CORN FAIRING- NACELLE FAIRING
 RUN 152 TP 7

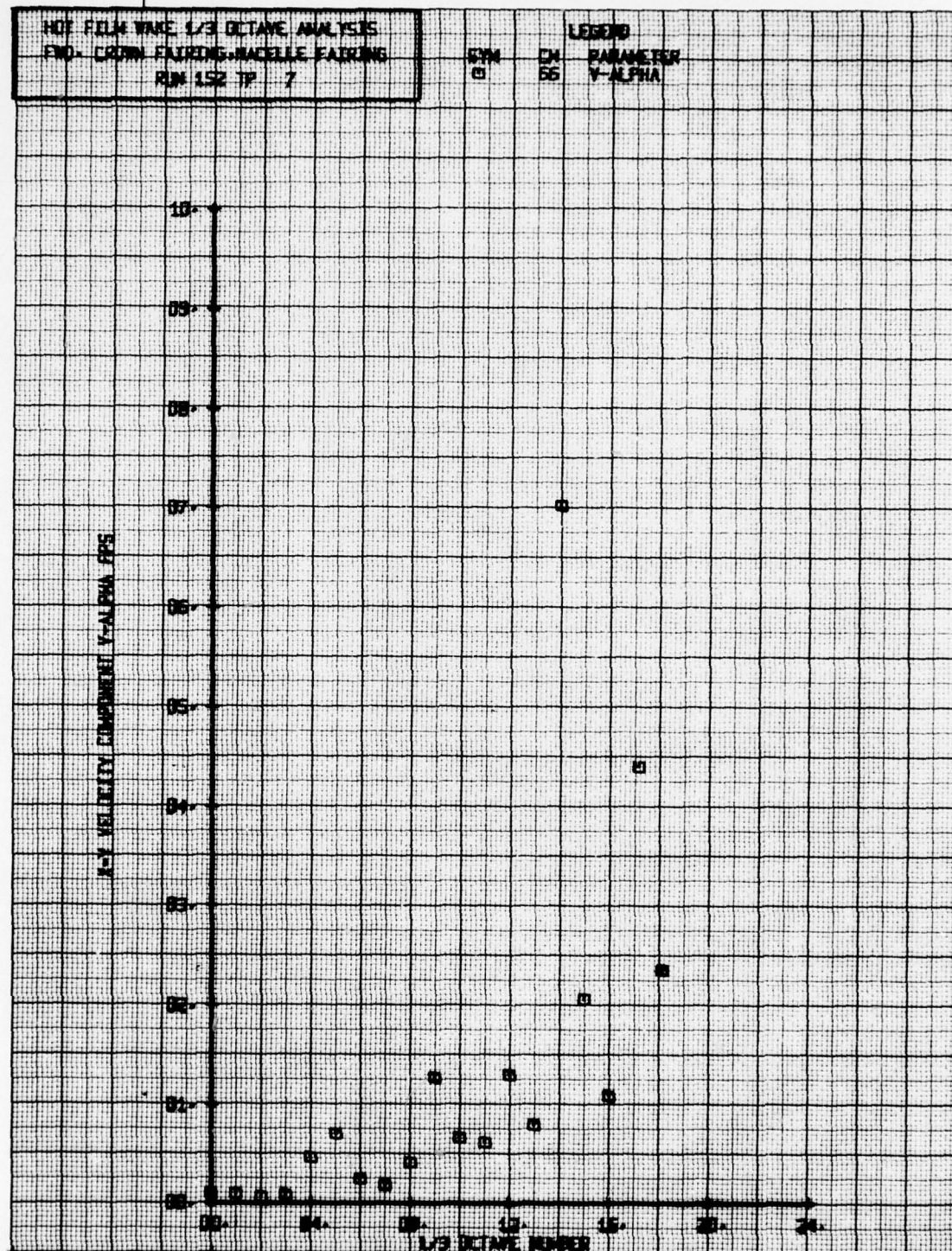
SYM
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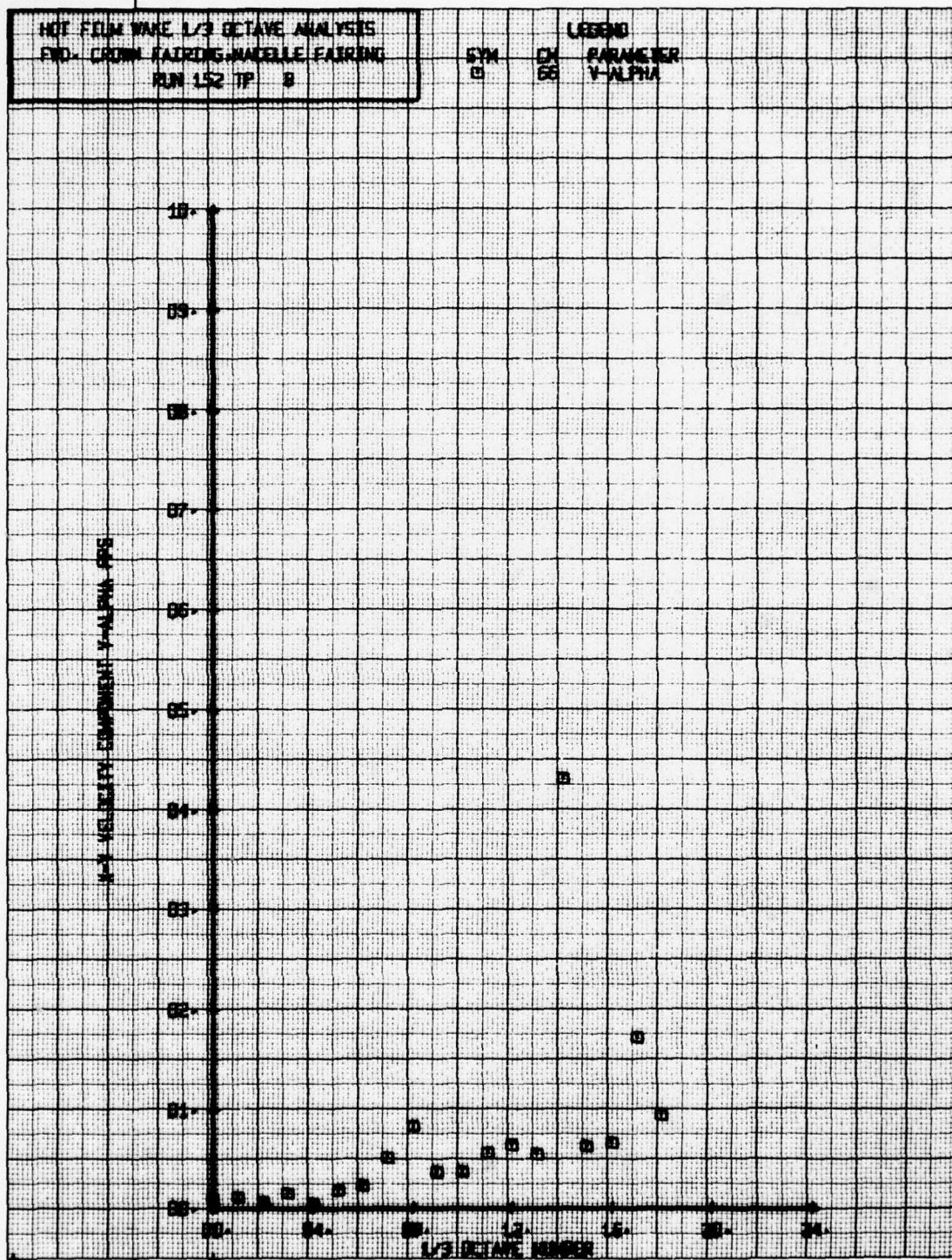
CH
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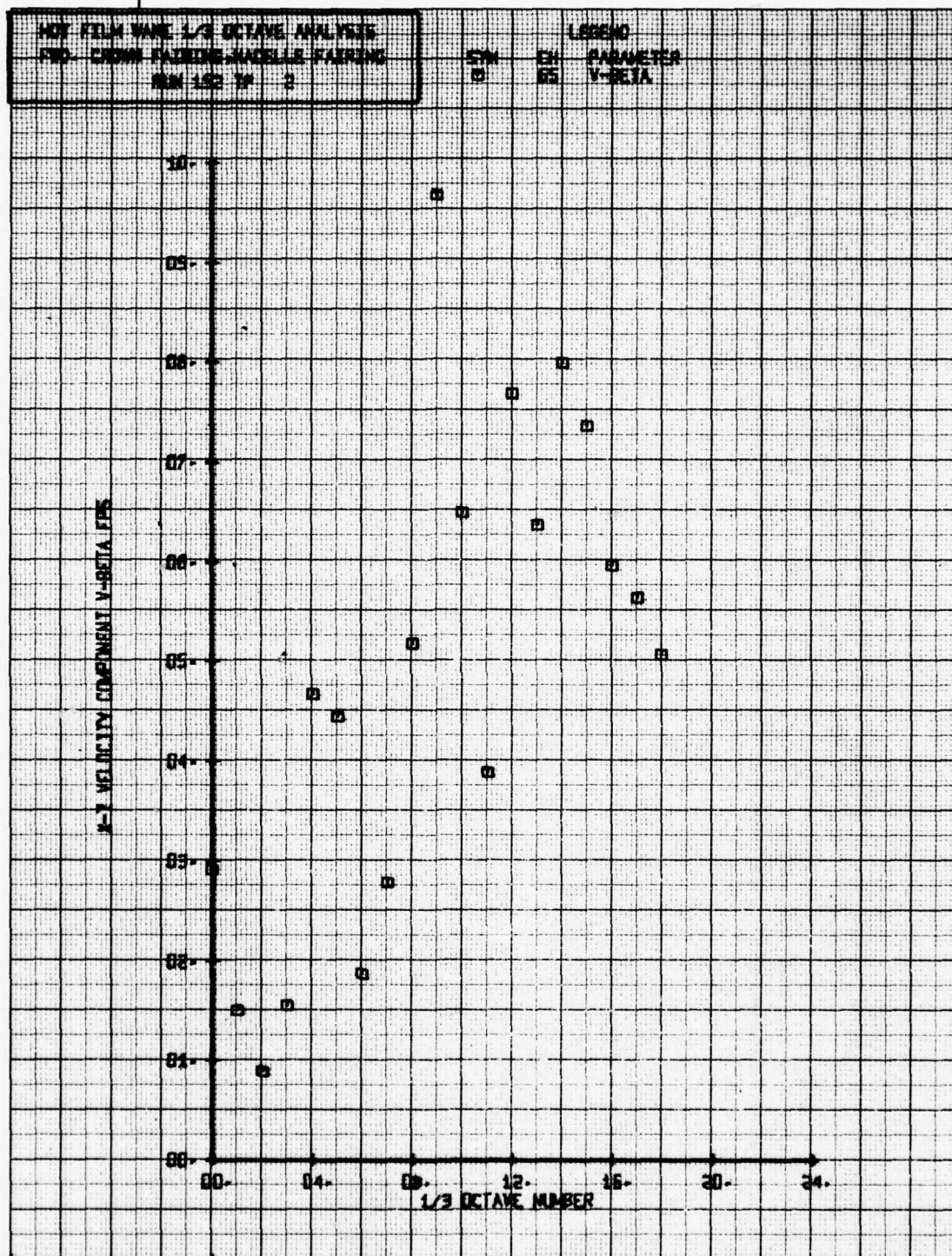
LEGEND
 PARAMETER
 Y-ALPHA

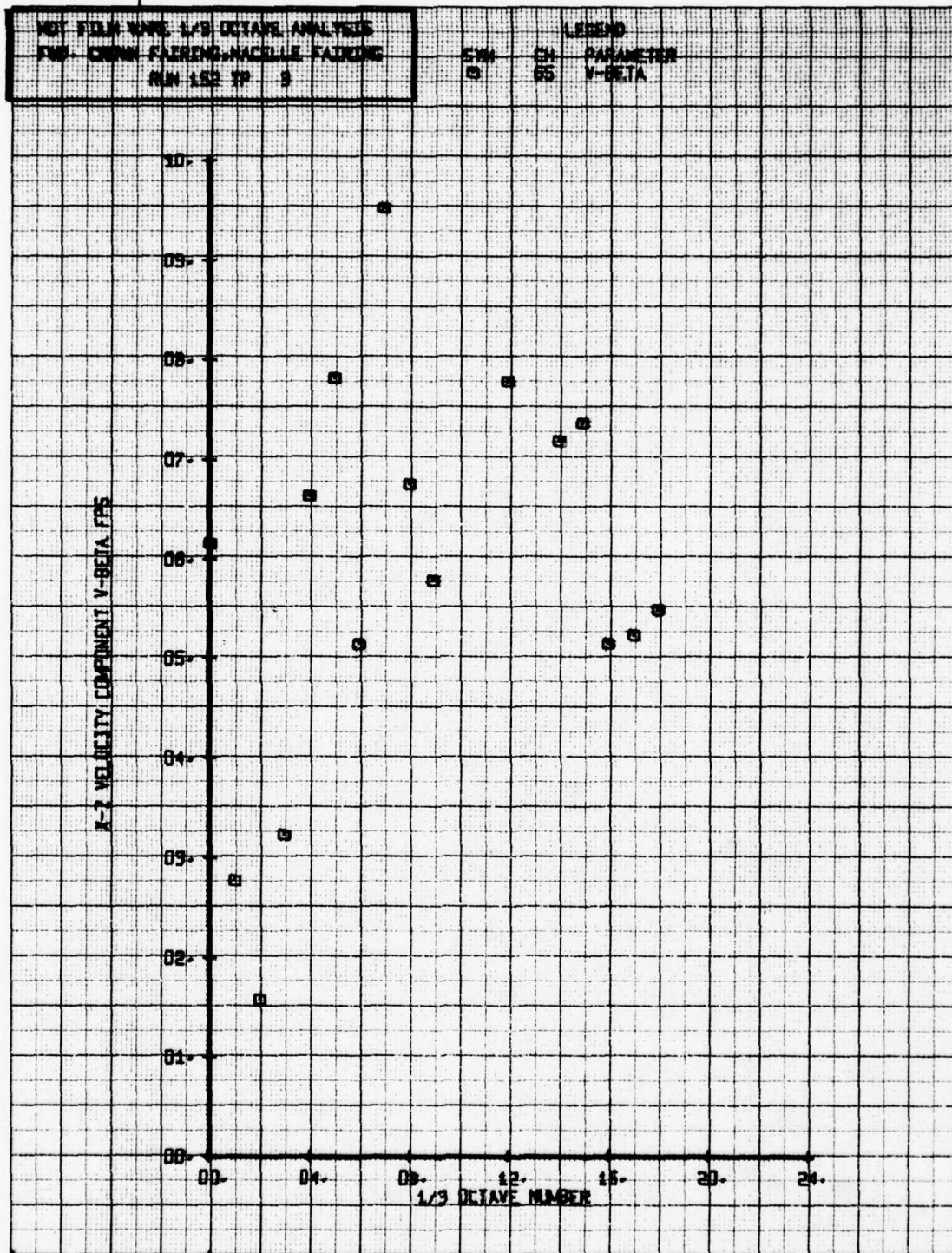
X-Y VELOCITY COMPONENT Y-ALPHA FPS

1/3 OCTAVE NUMBER







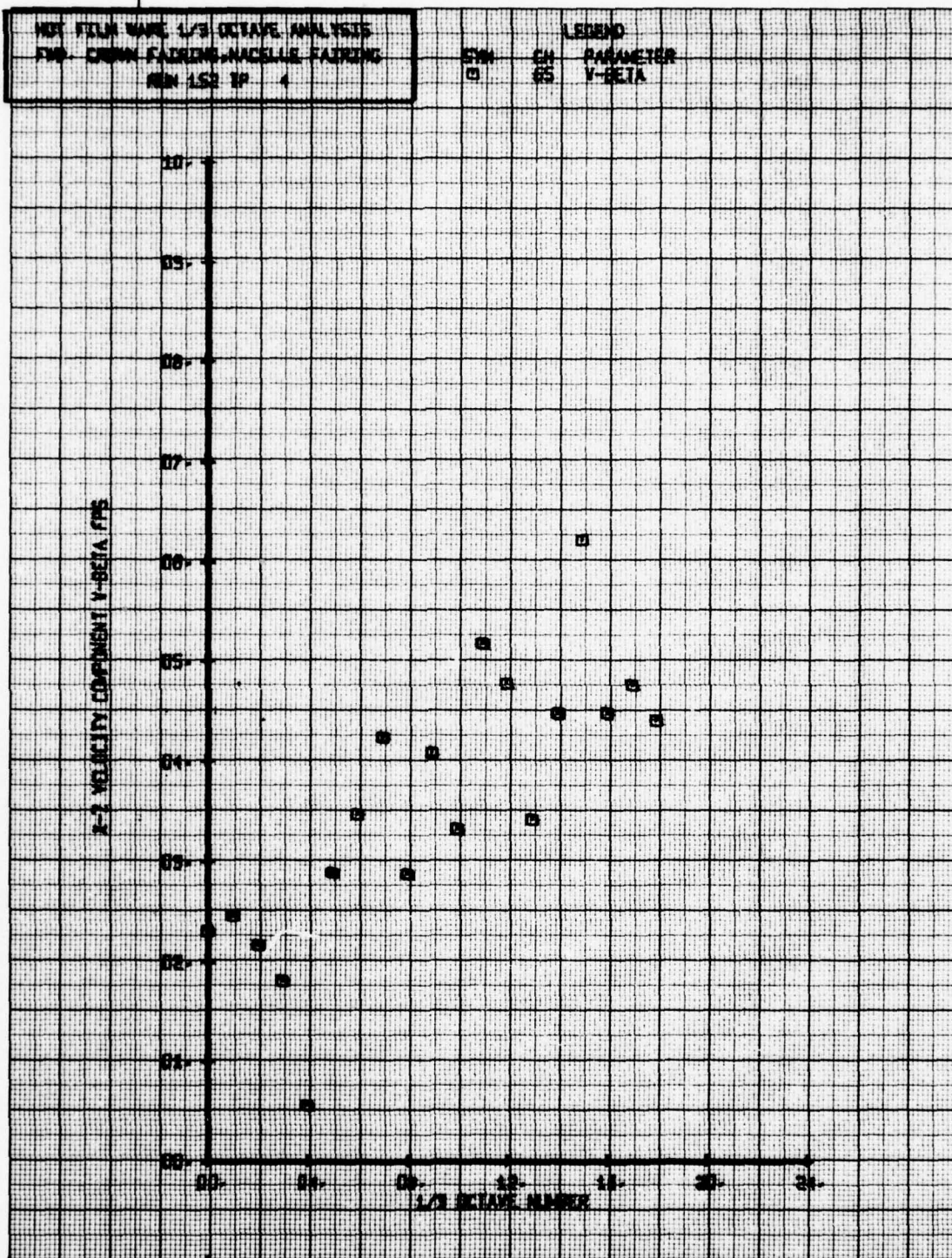


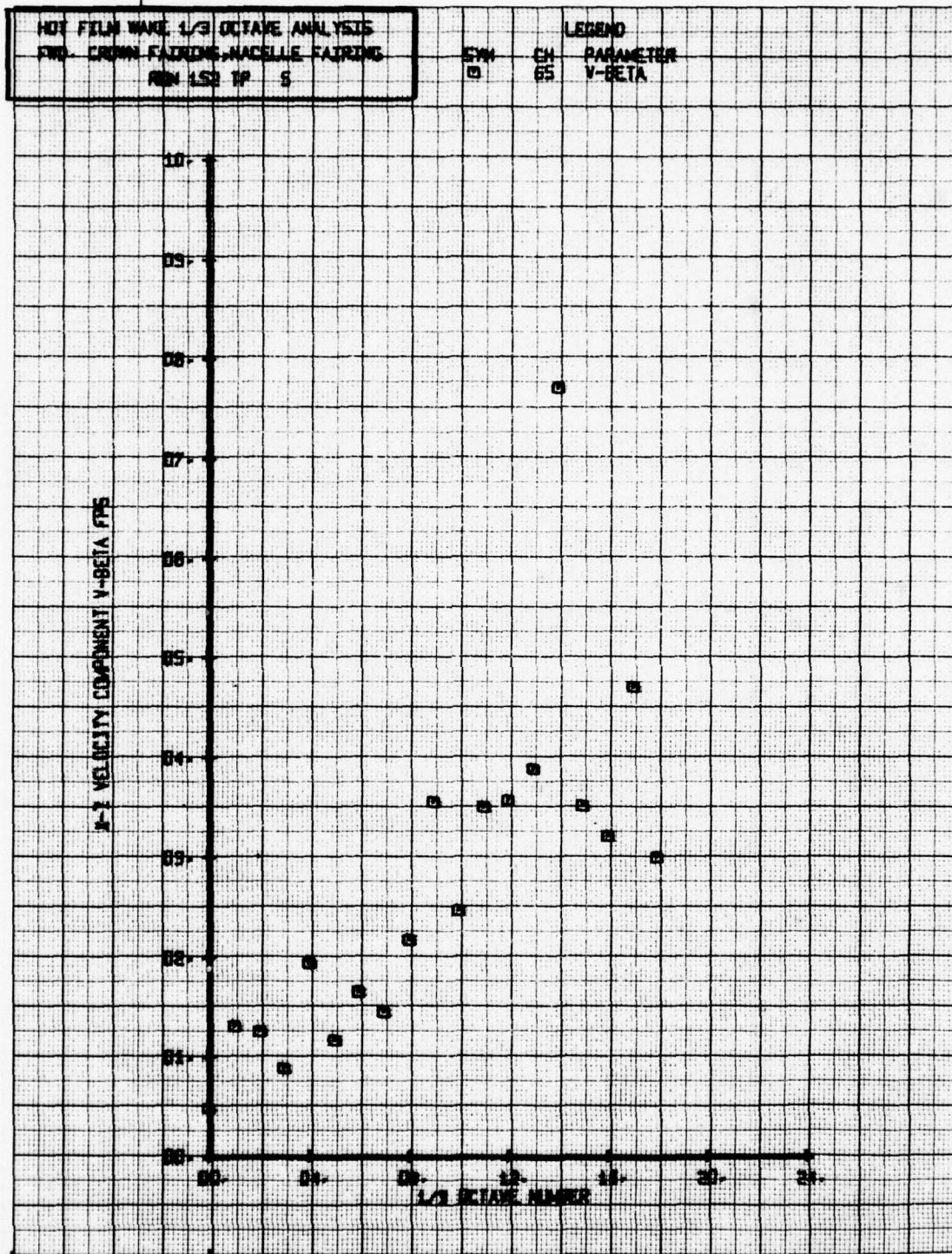
NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 FWD - DOWN FAIRING, NACELLE FAIRING
 RUN 152 TP 4

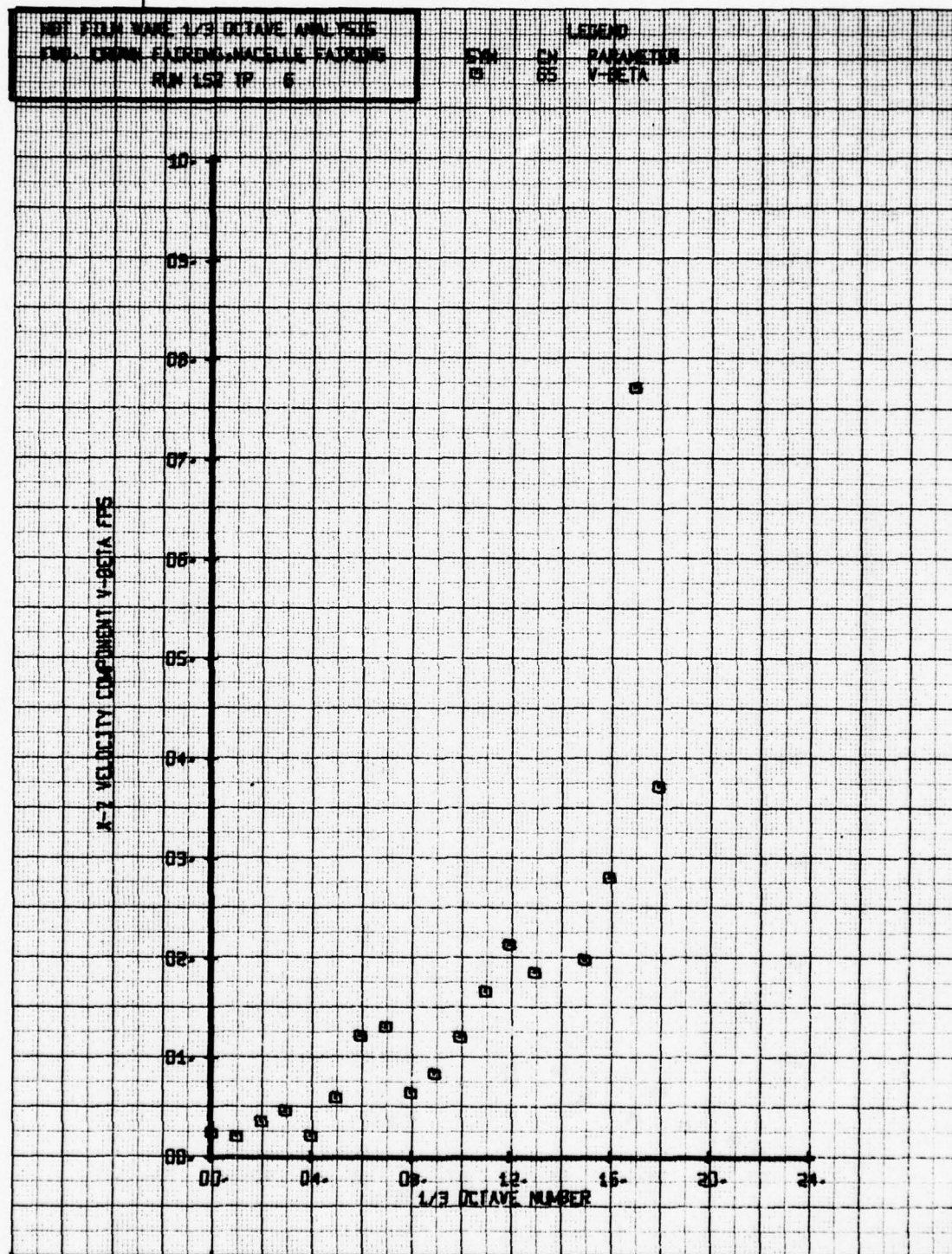
LEGEND
 CH PARAMETER
 65 V-BETA

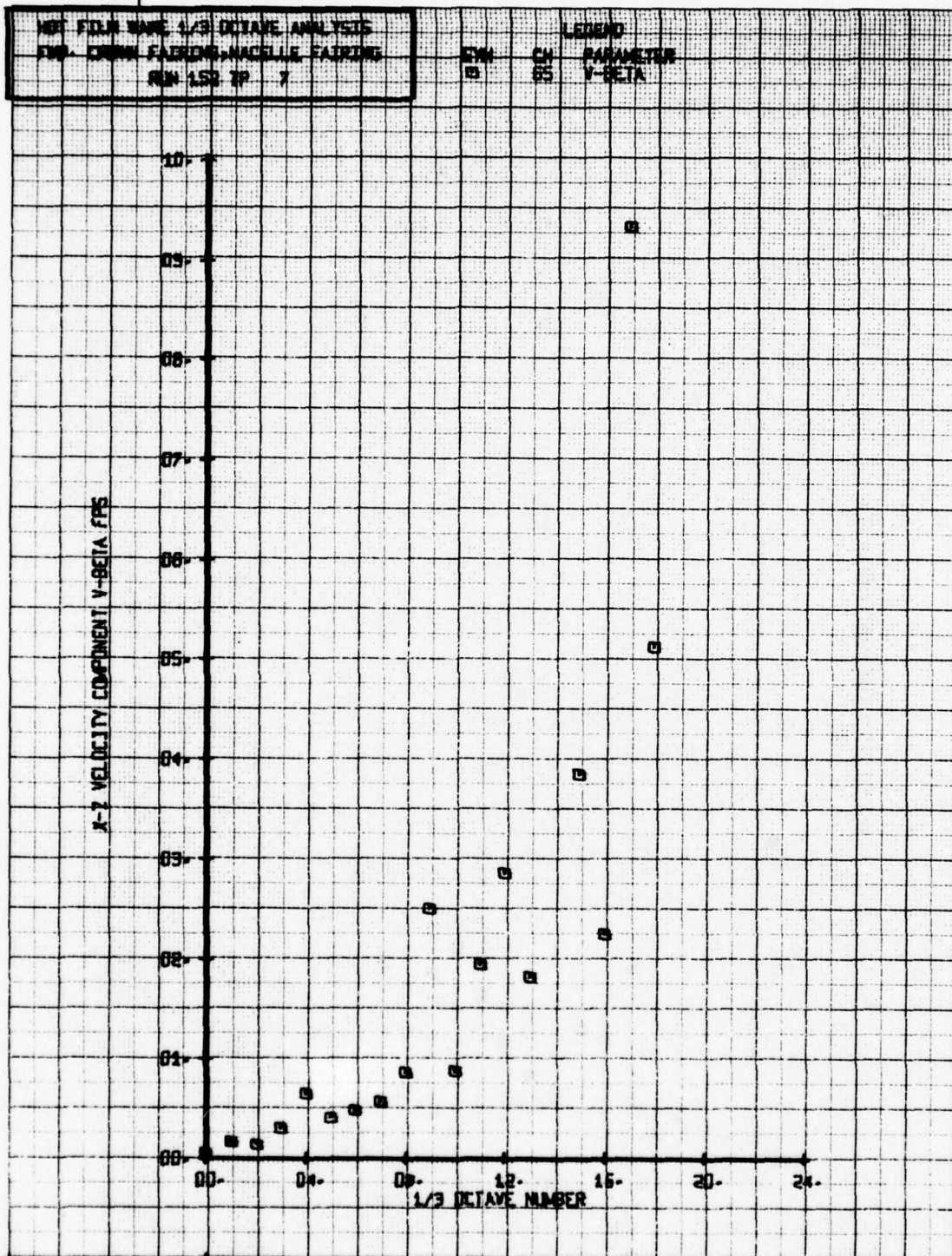
X-2 VELOCITY COMPONENT V-BETA FPS

1/3 OCTAVE NUMBER





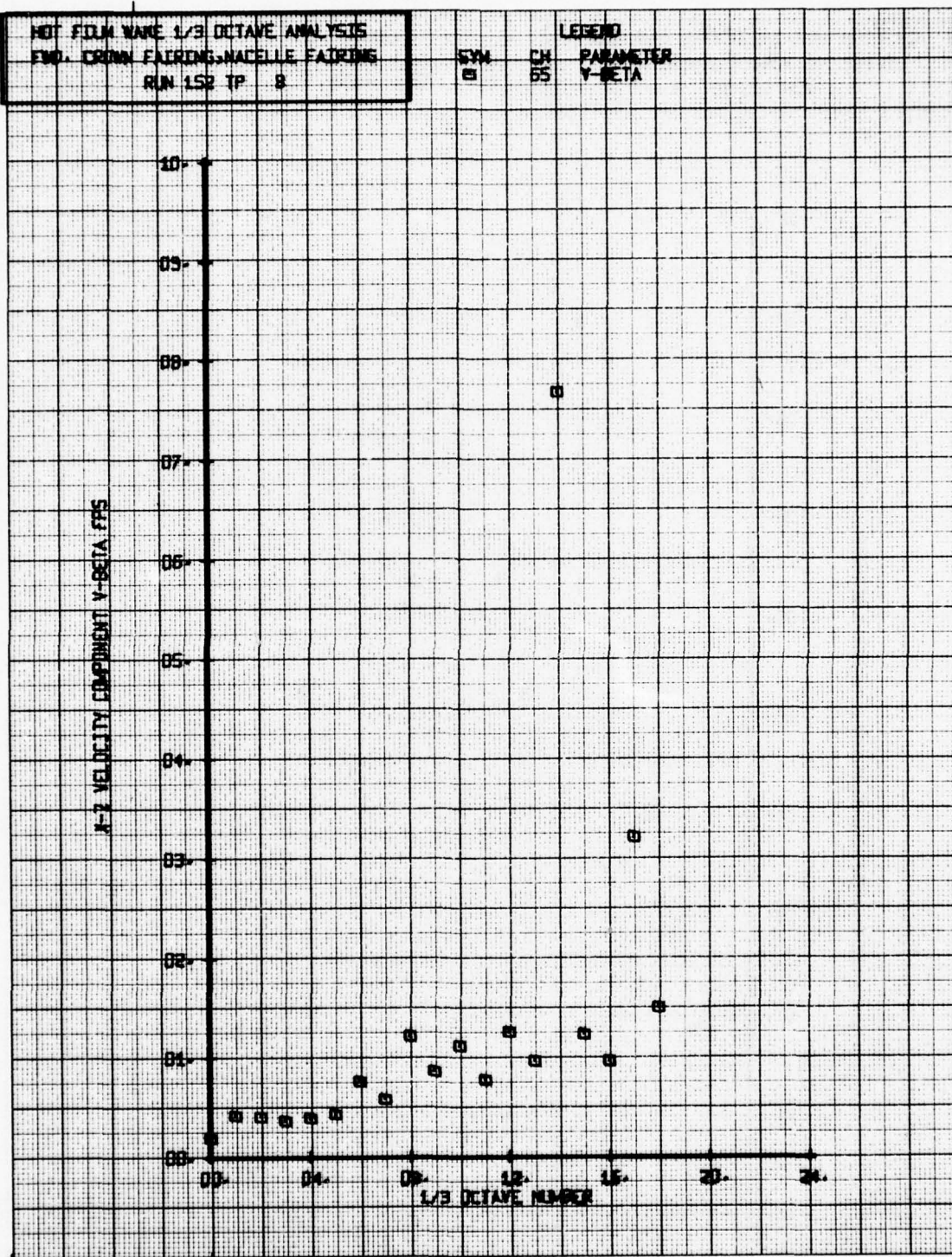




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 FWD. CONN FAIRING, NACELLE FAIRING
 RUN 152 TP 8

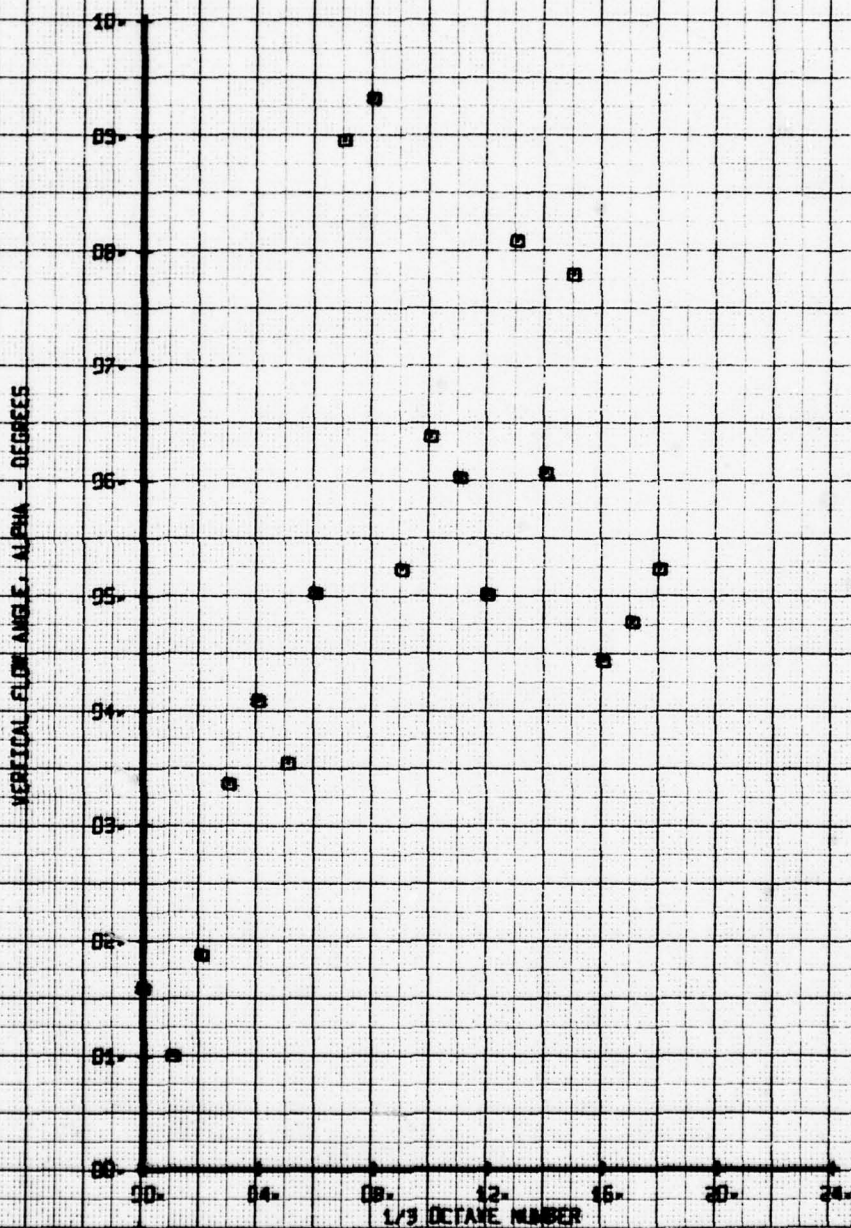
LEGEND
 CH 65
 PARAMETER
 Y-BETA

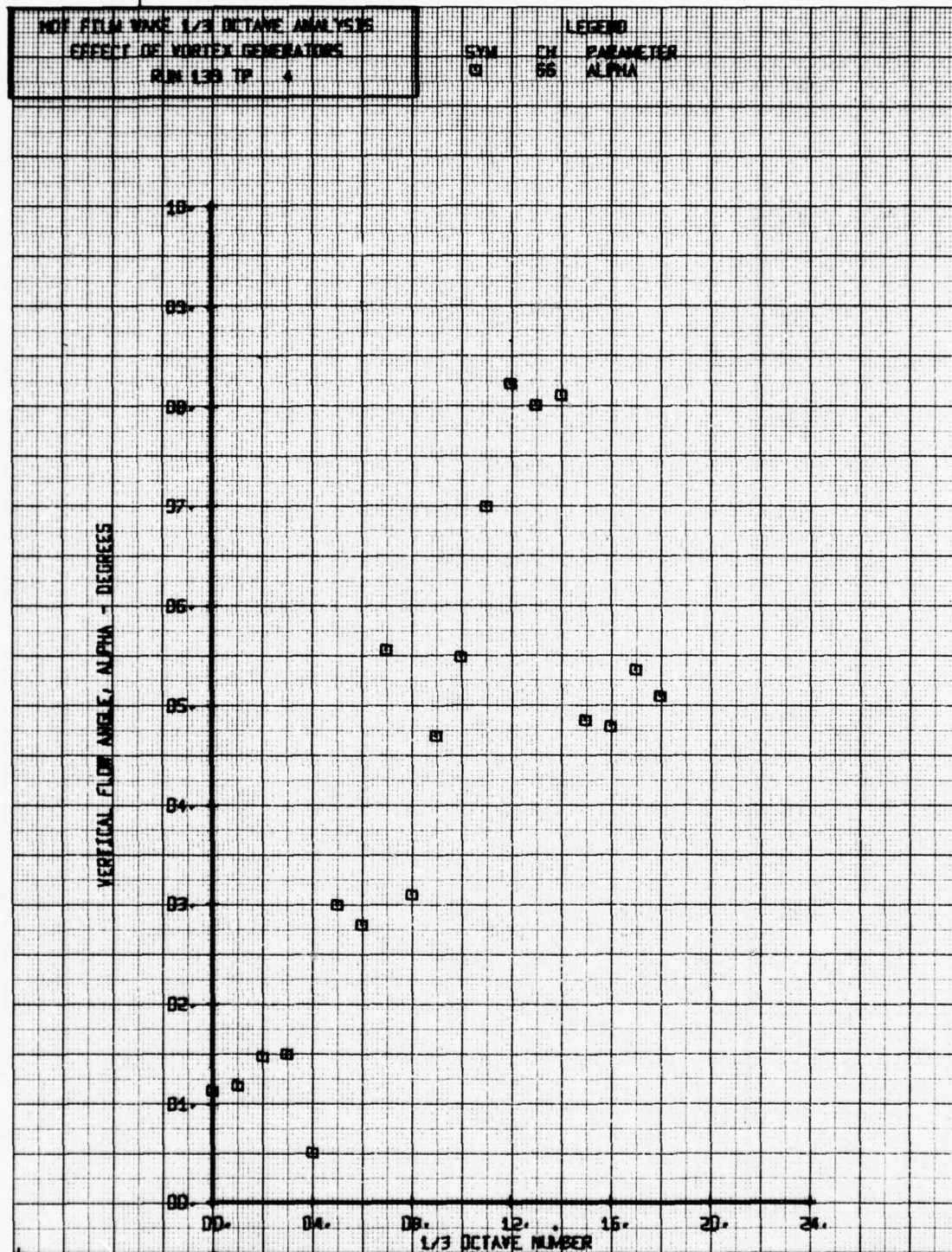
X-Z VELOCITY COMPONENT Y-BETA FHS

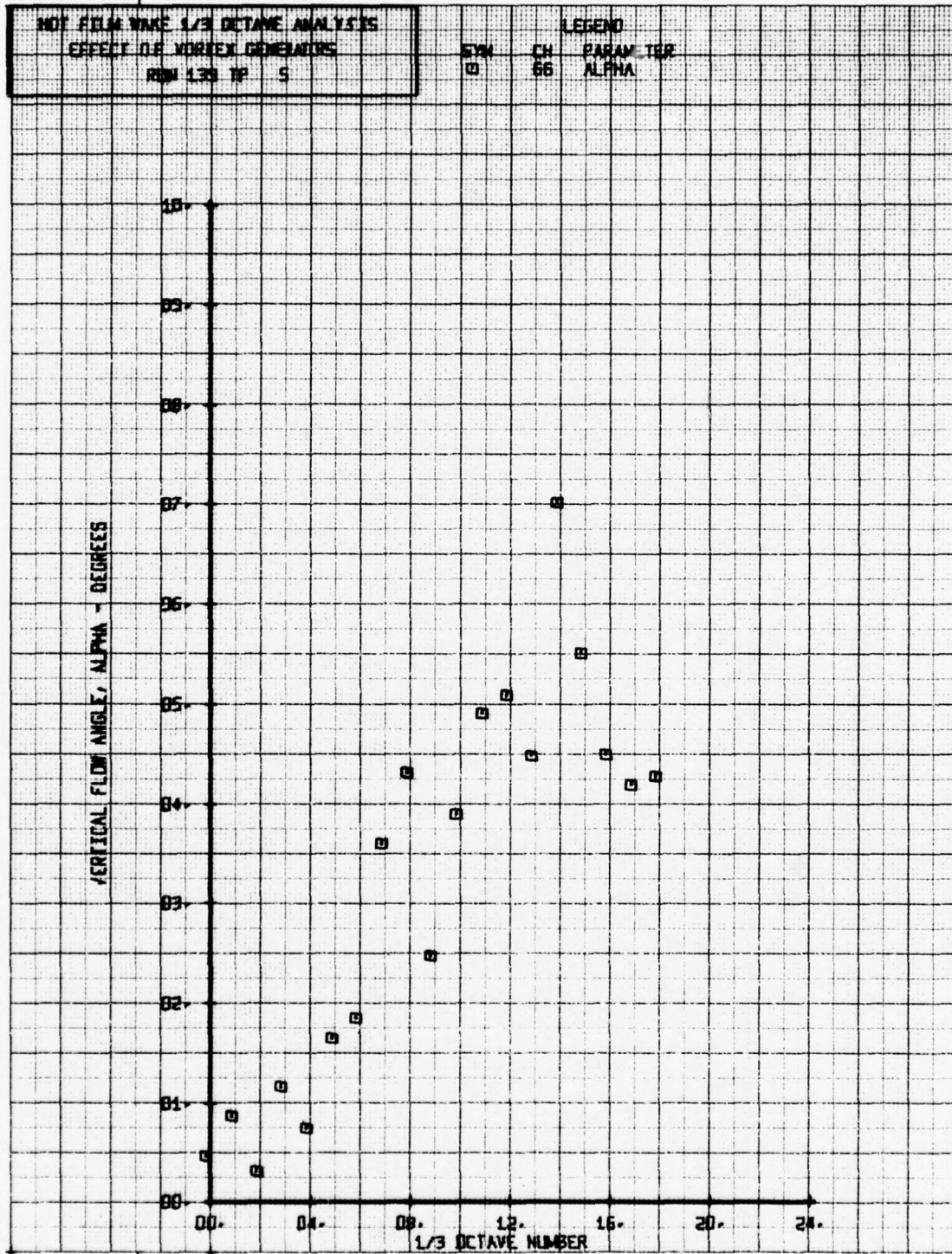


HOT FILM WAVE 1/3 OCTAVE ANALYSIS
EFFECT OF MONEX GENERATORS
RUN 139 TP 3

SYN CH PARAMETER
0 66 ALPHA

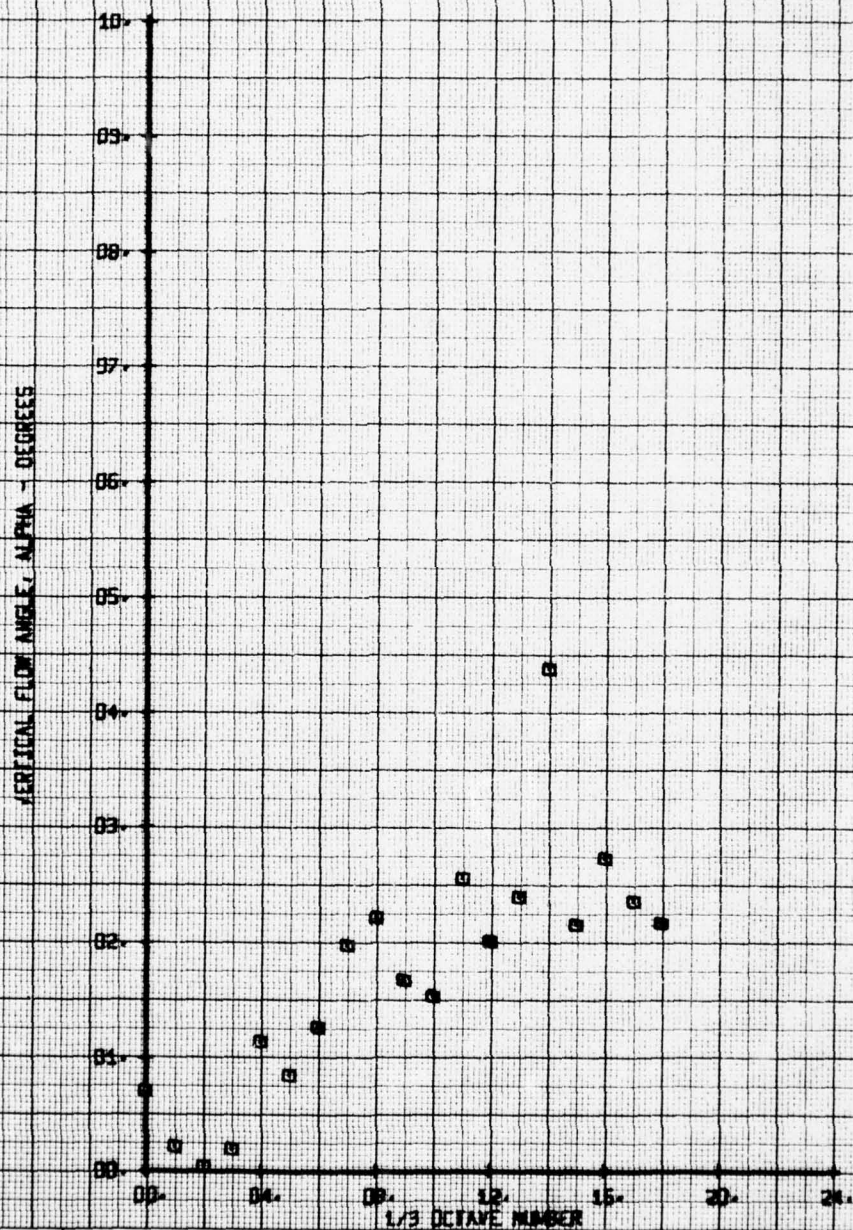






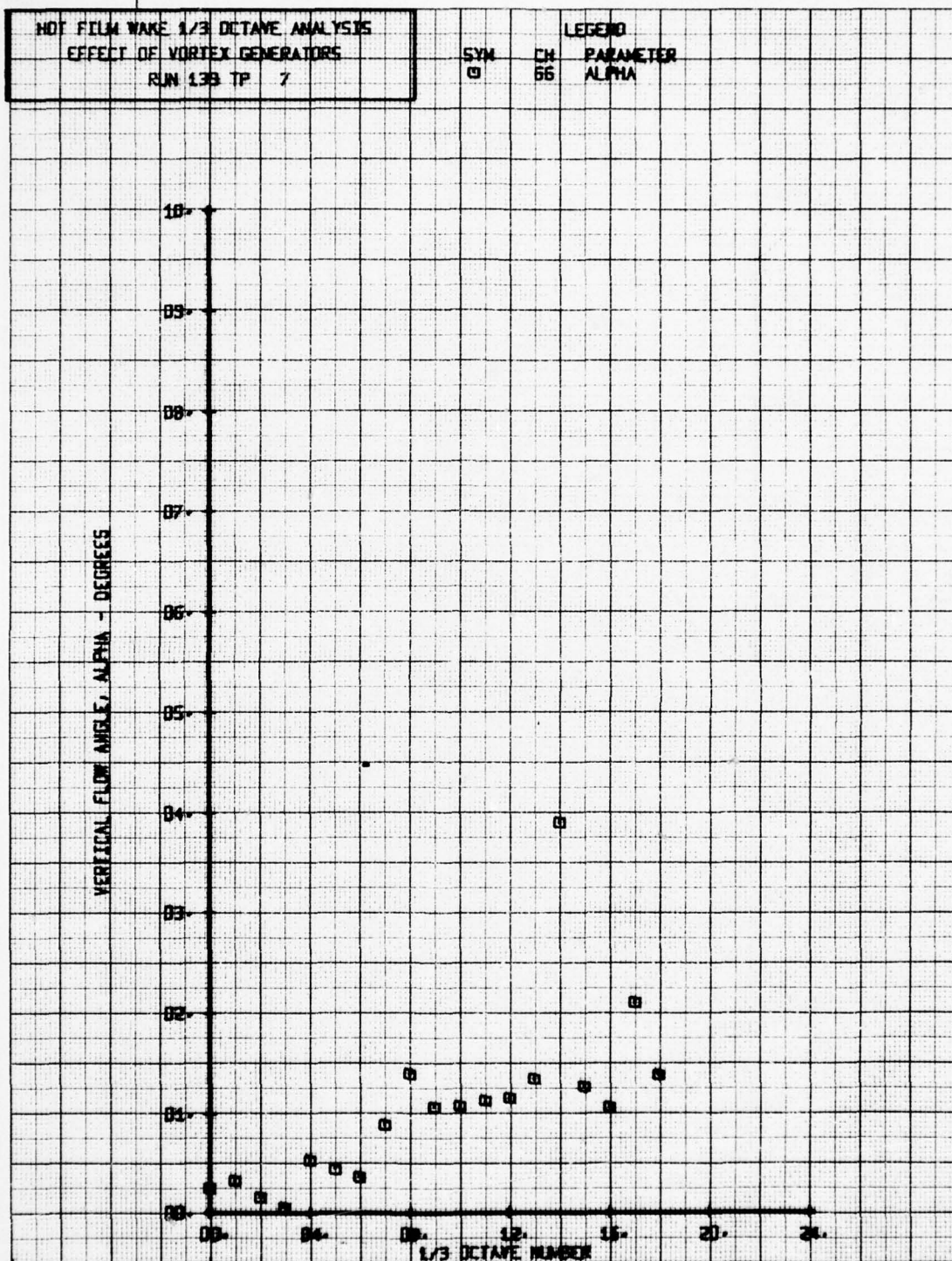
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 6

LEGEND
SYM CH PARAMETER
Q 66 ALPHA



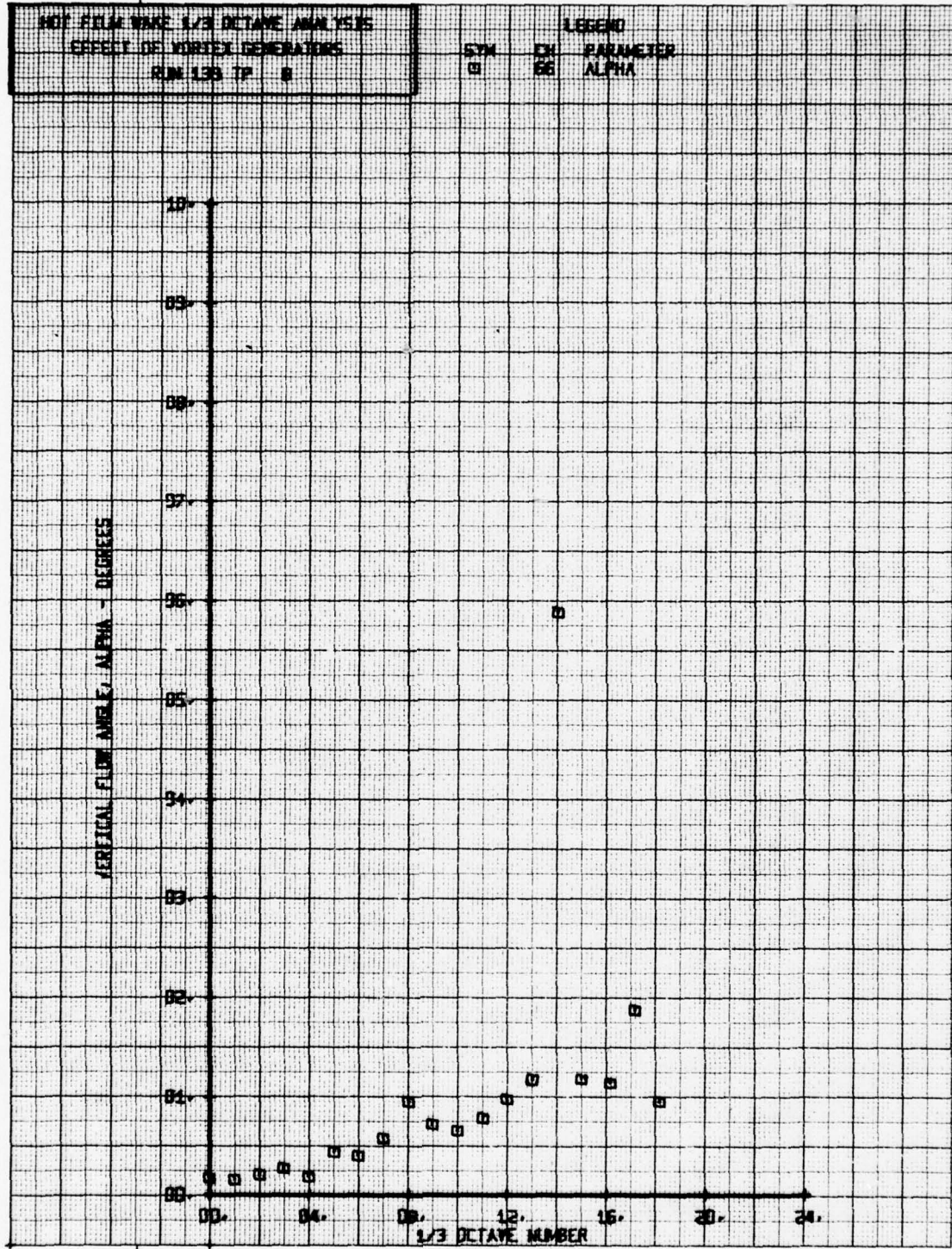
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 133 TP 7

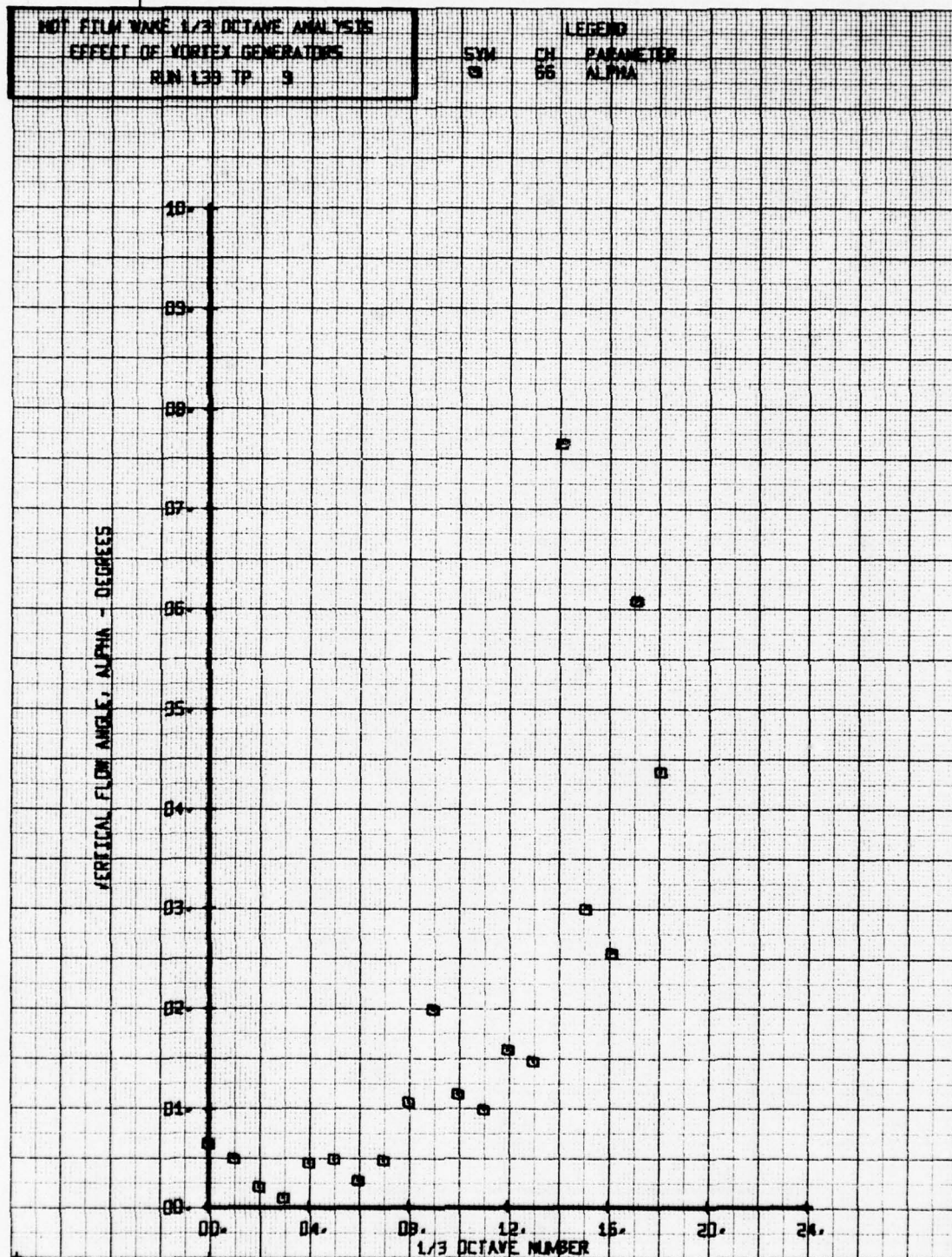
LEGEND
SYM CH PARAMETER
□ 66 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 135 TP 8

LEGEND
SYM CN PARAMETER
□ 66 ALPHA

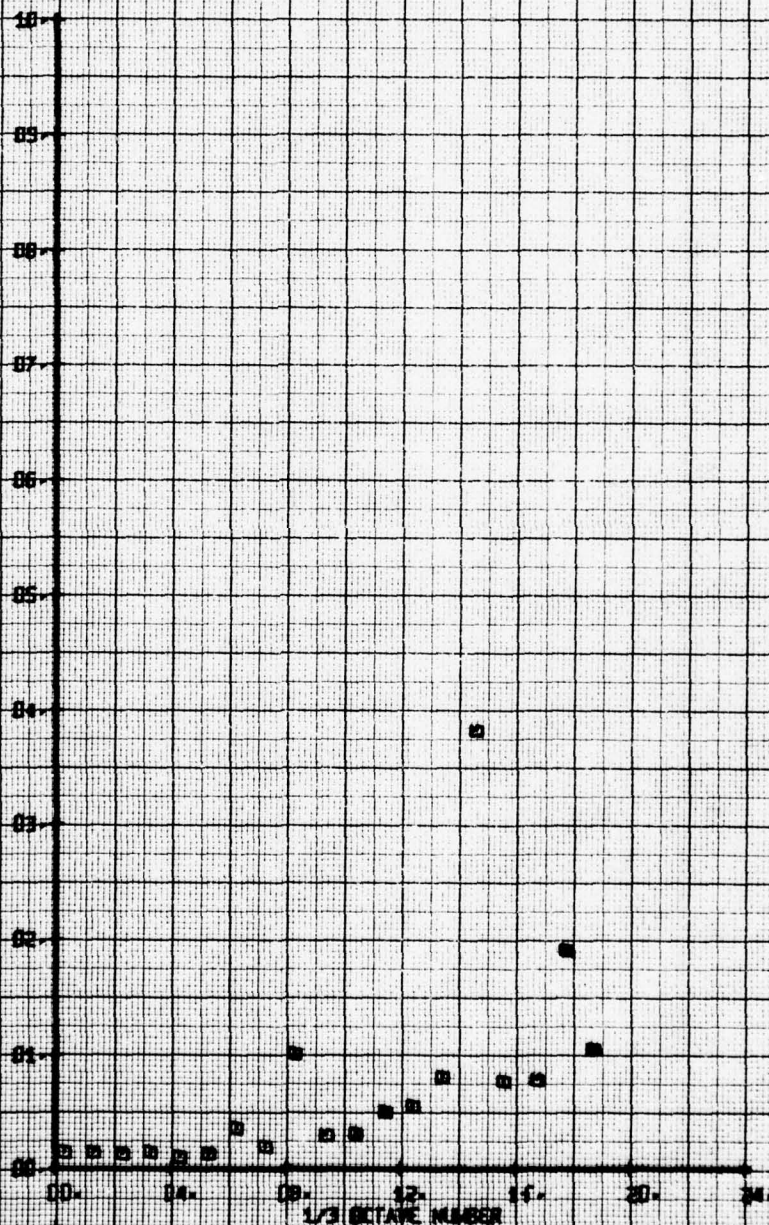




NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 10

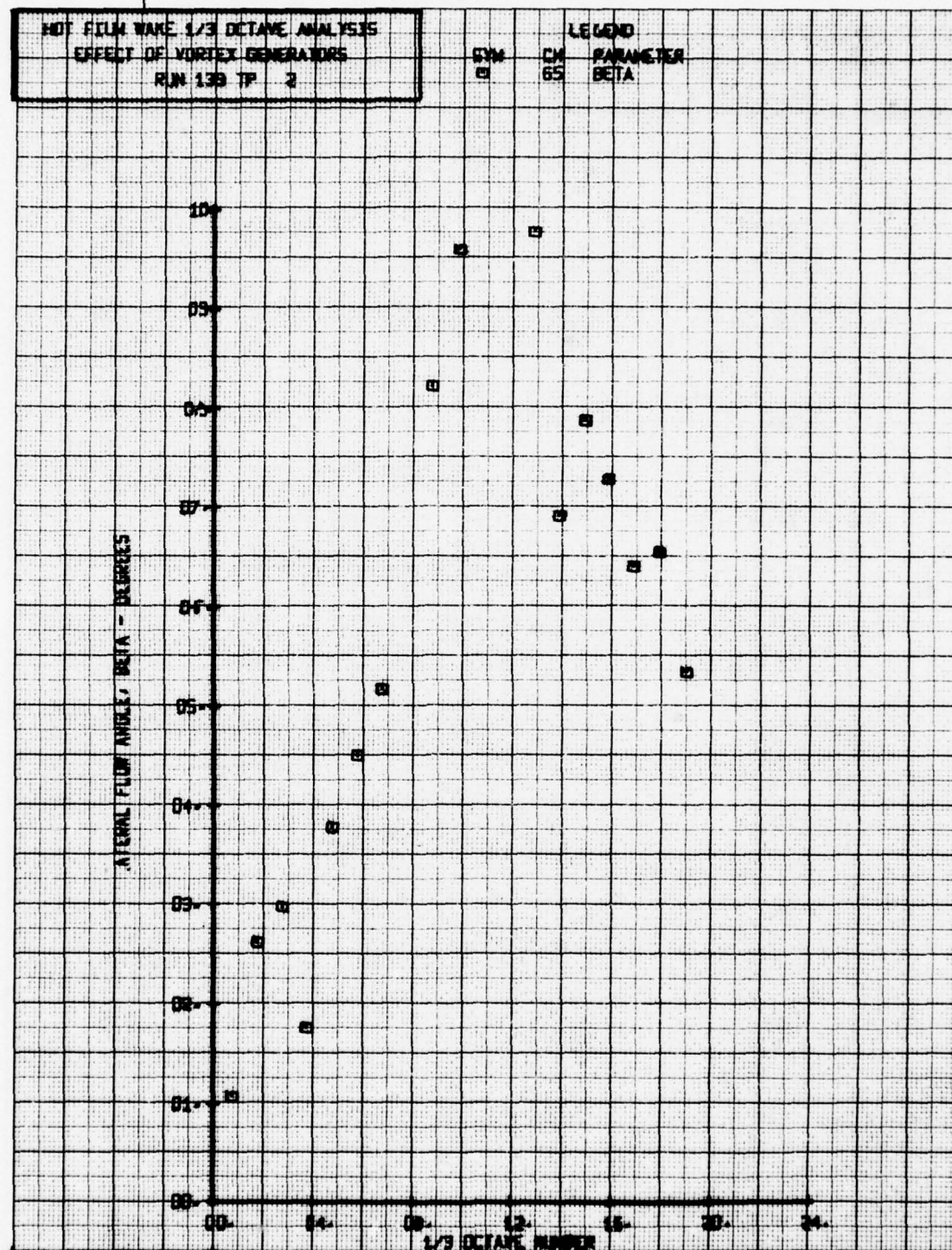
LEGEND
SYM CH PARAMETER
O 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 2

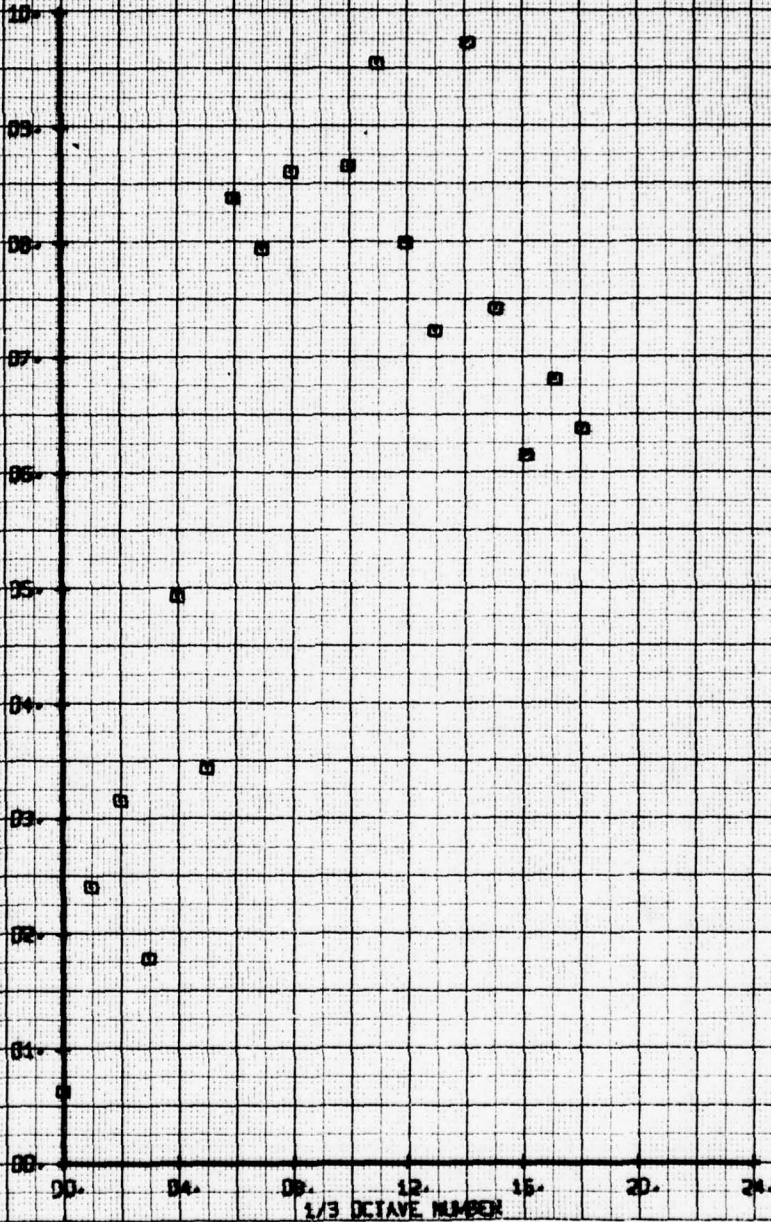
LEGEND
SYM CM PARAMETER
□ 65 BETA



NOT FILM TAKE 1/3 OCTAVE ANALYSIS
EFFECT OF KORTX GENERATORS
RUN 130 TP 3

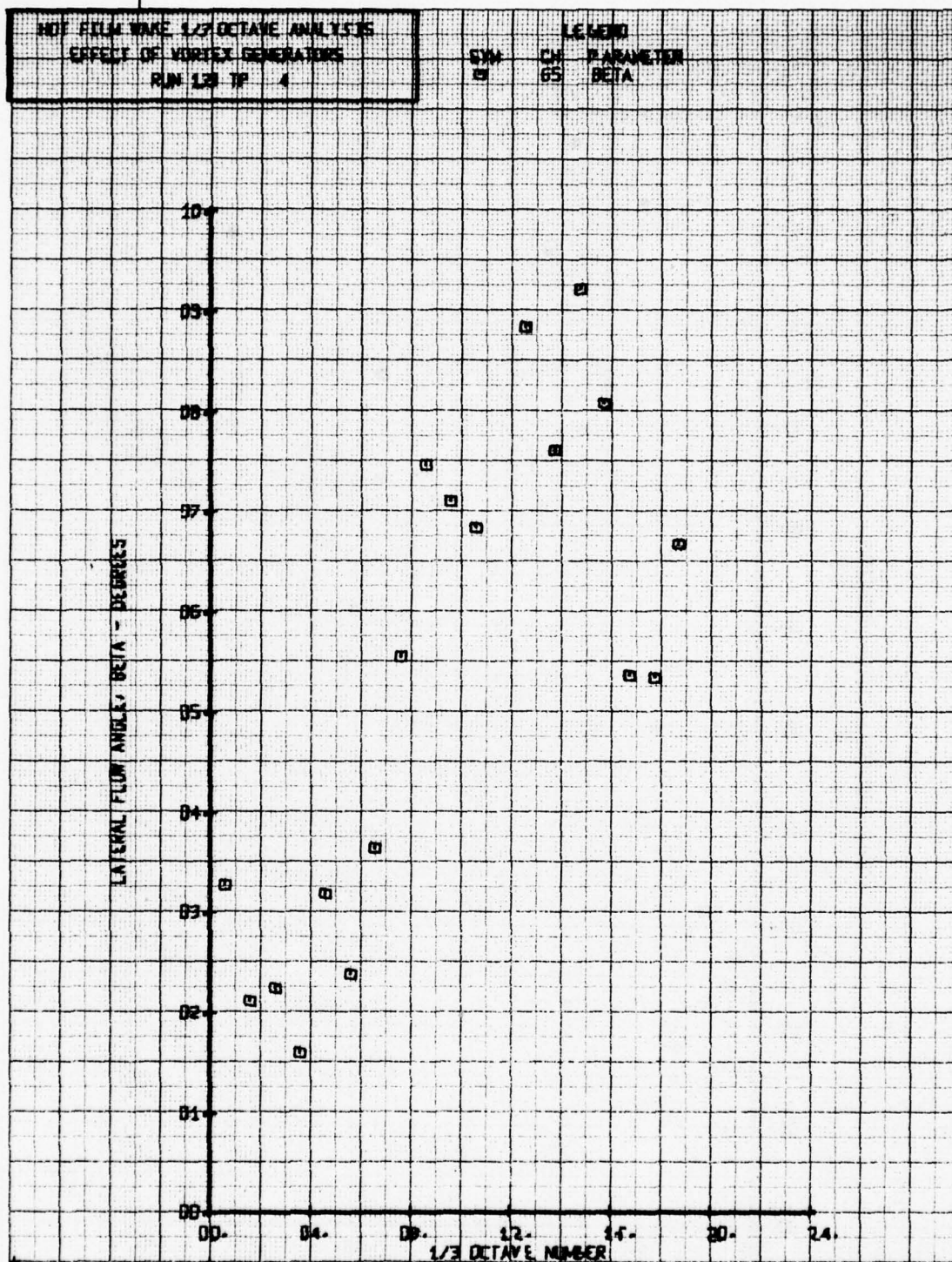
LEGEND
SYM OR PARAMETER
□ SS BETA

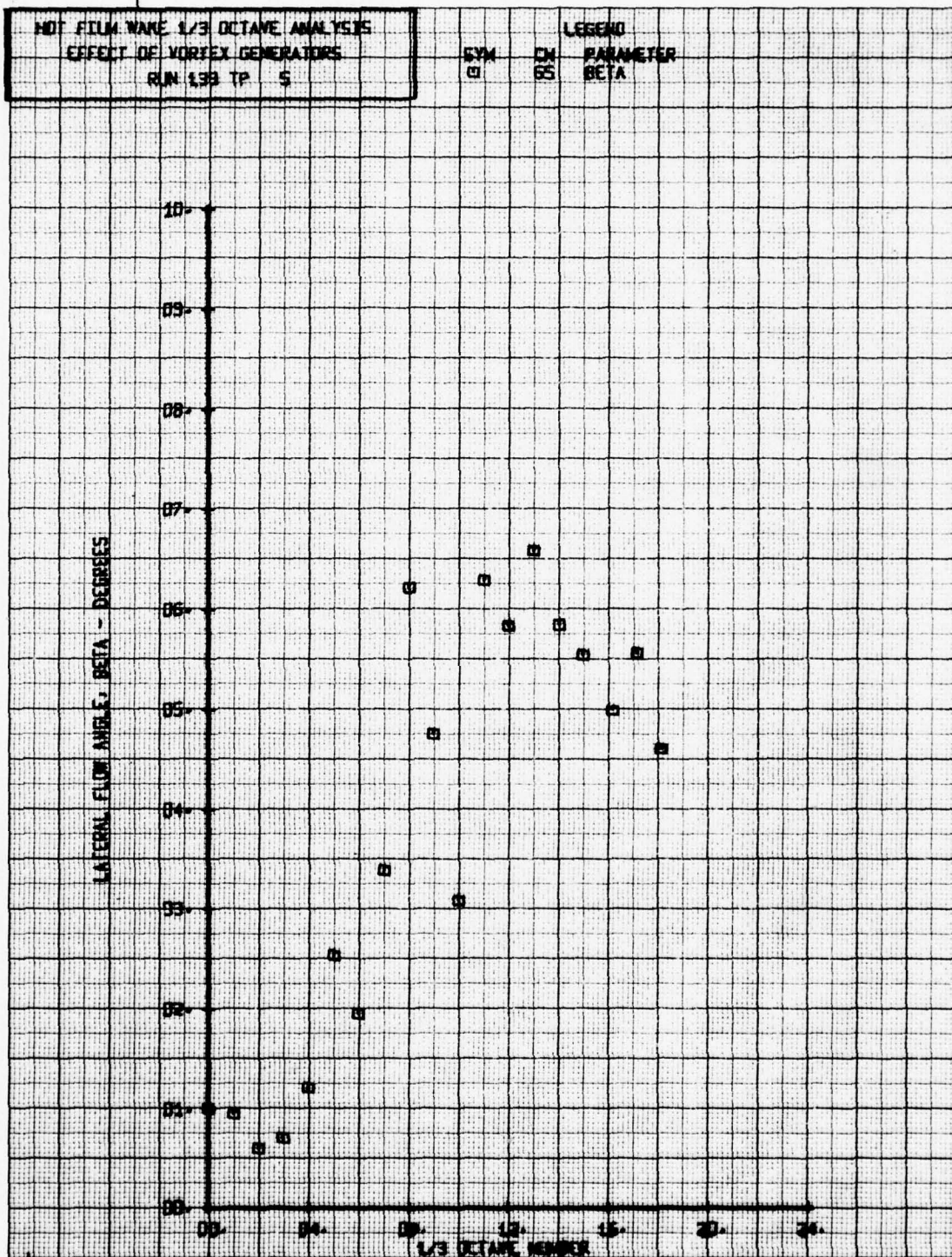
AFERAL FLOW ANGLE, BETA - DEGREES



NOI FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 128 TP 4

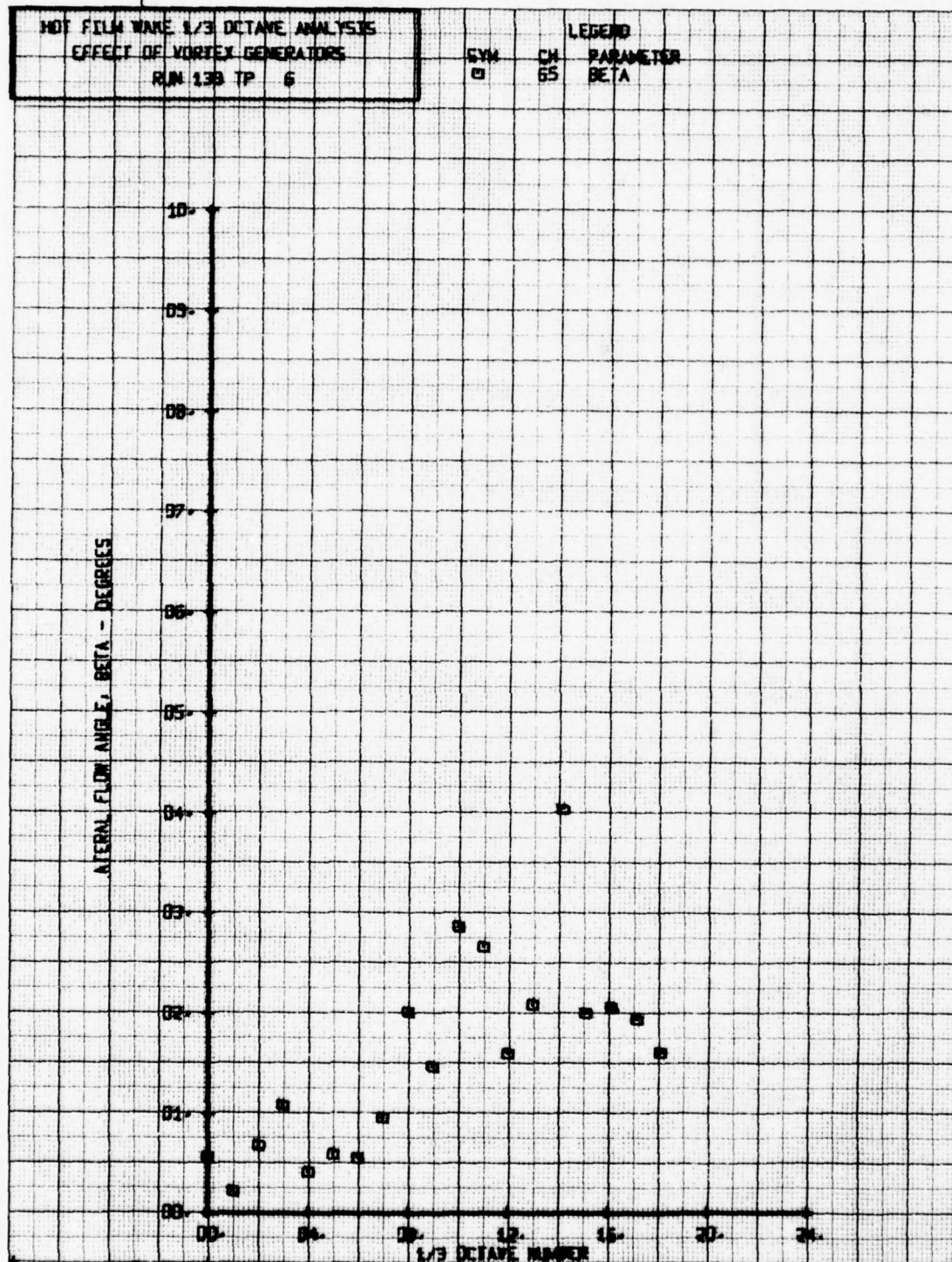
SYN CH PARAMETER
81 65 BETA

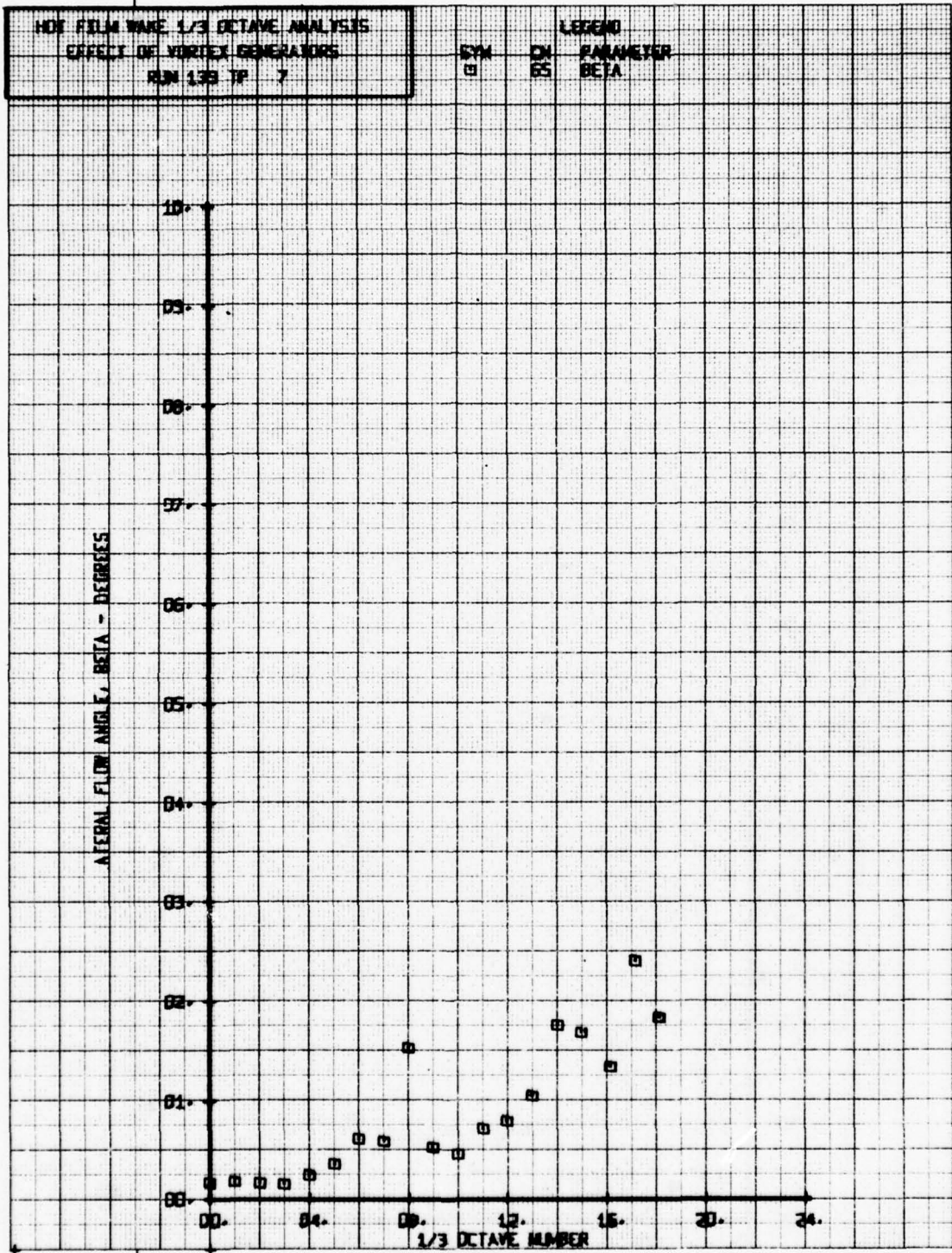




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 138 TP 6

LEGEND
SYM CH PARAMETER
□ 65 BETA

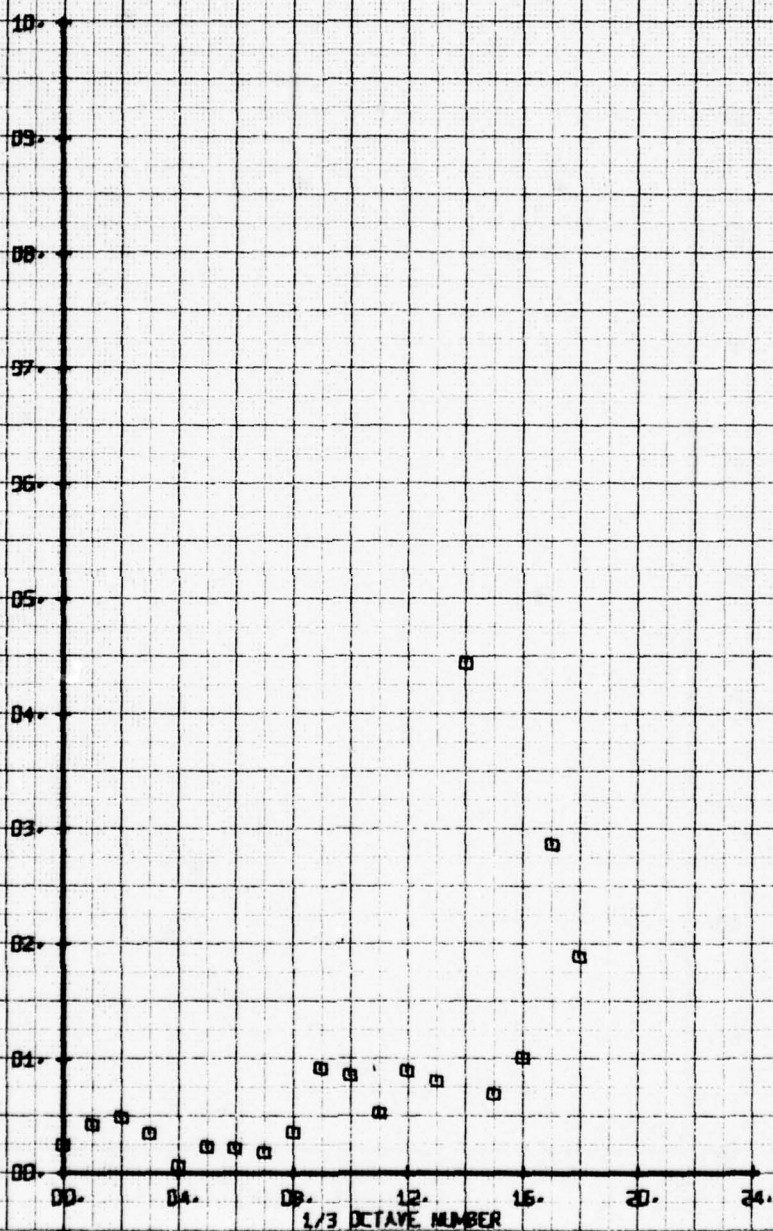


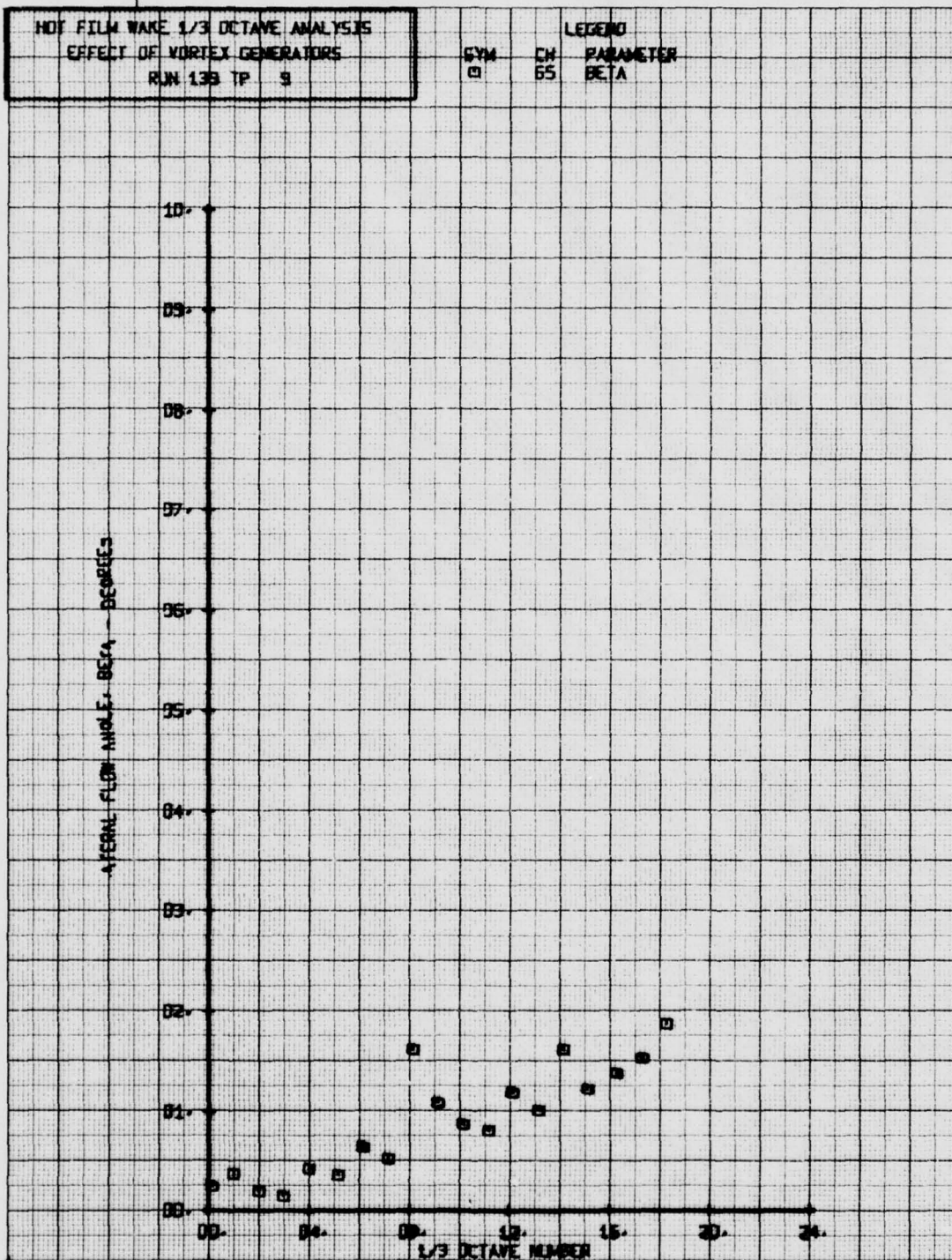


NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 8

LEGEND
SYM ON PARAMETER
□ 05 BETA

ALTERAL FLOW ANGLE, BETA - DEGREES





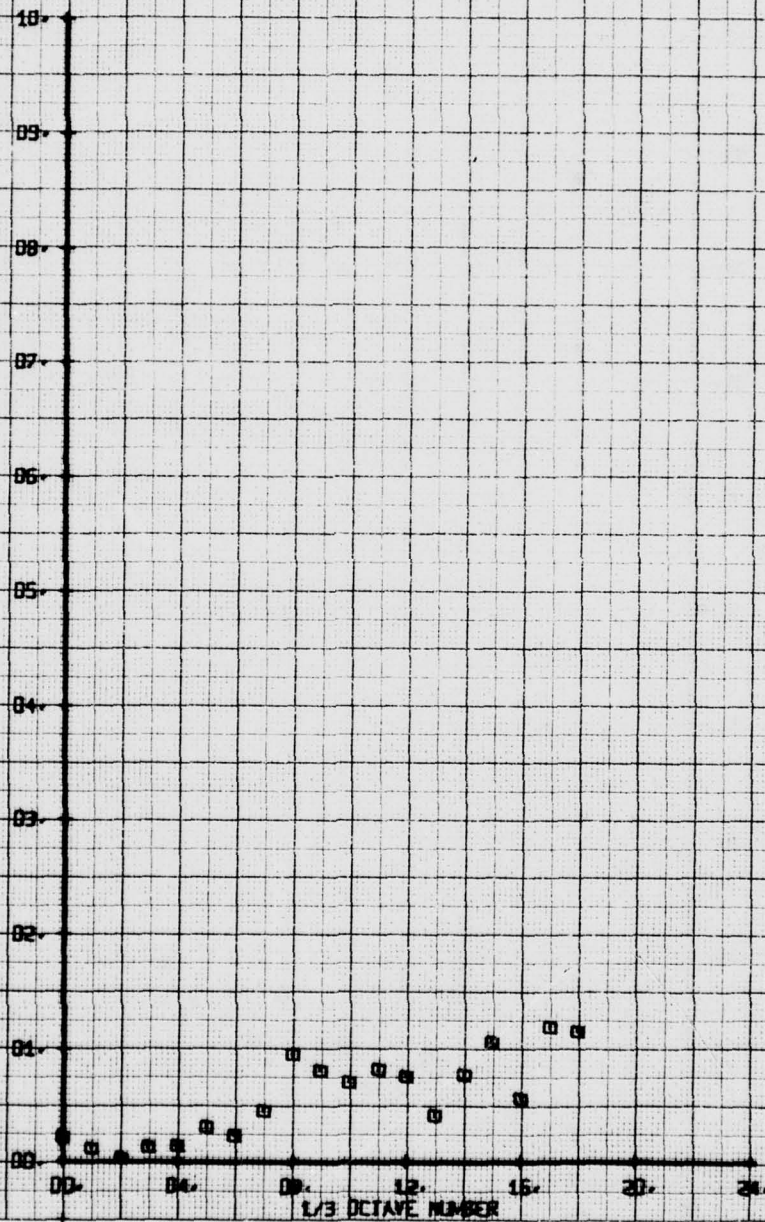
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EFFECT OF VORTEX GENERATORS
 RUN 139 TP 10

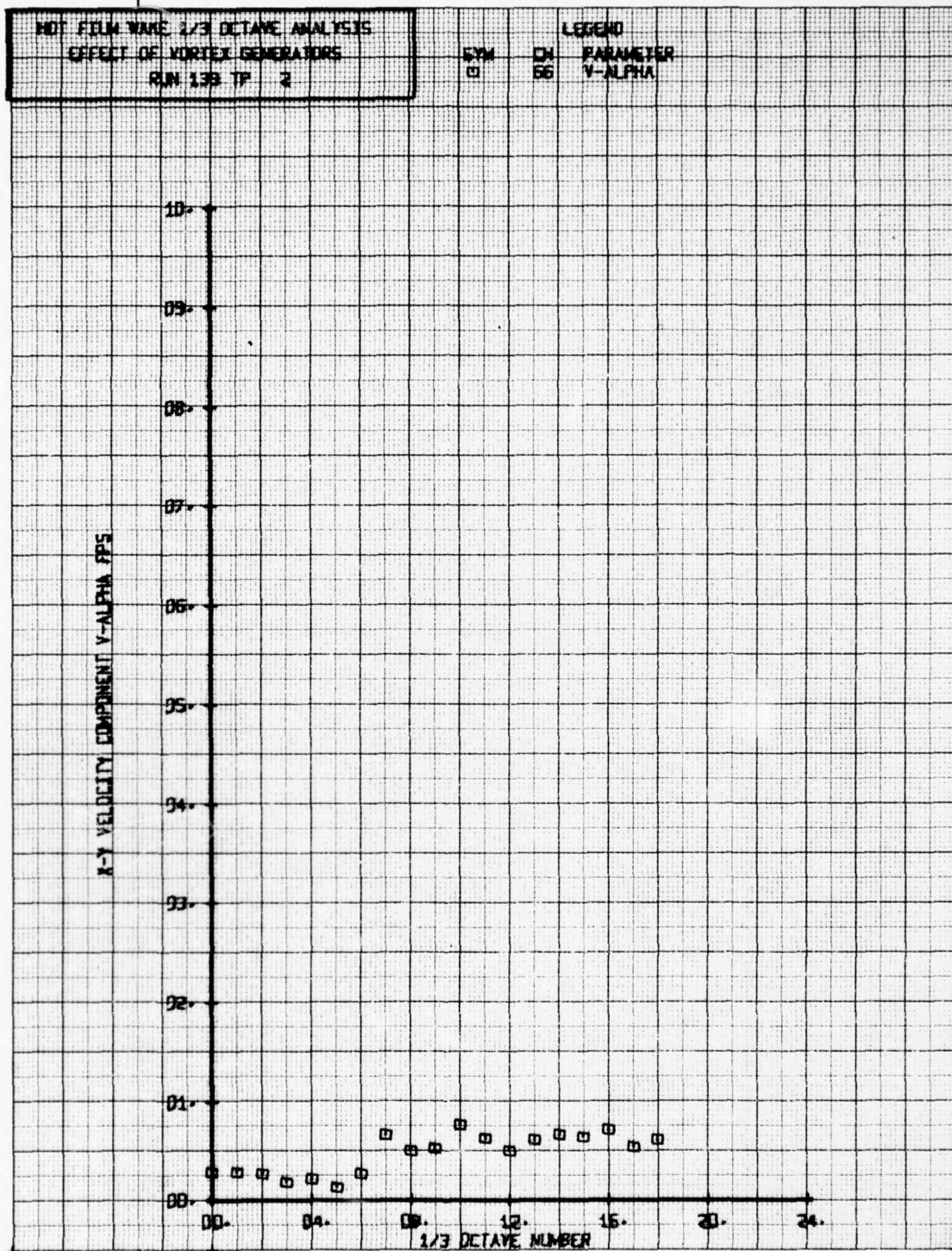
SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

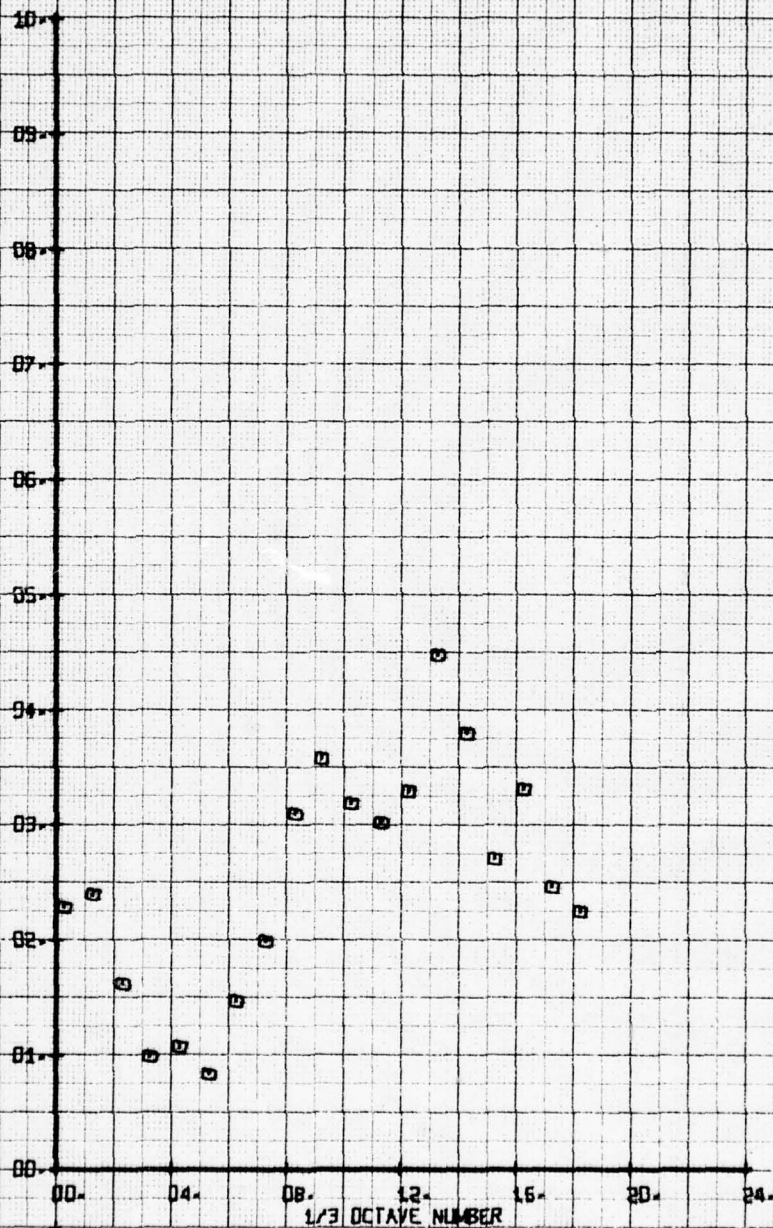




NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 3

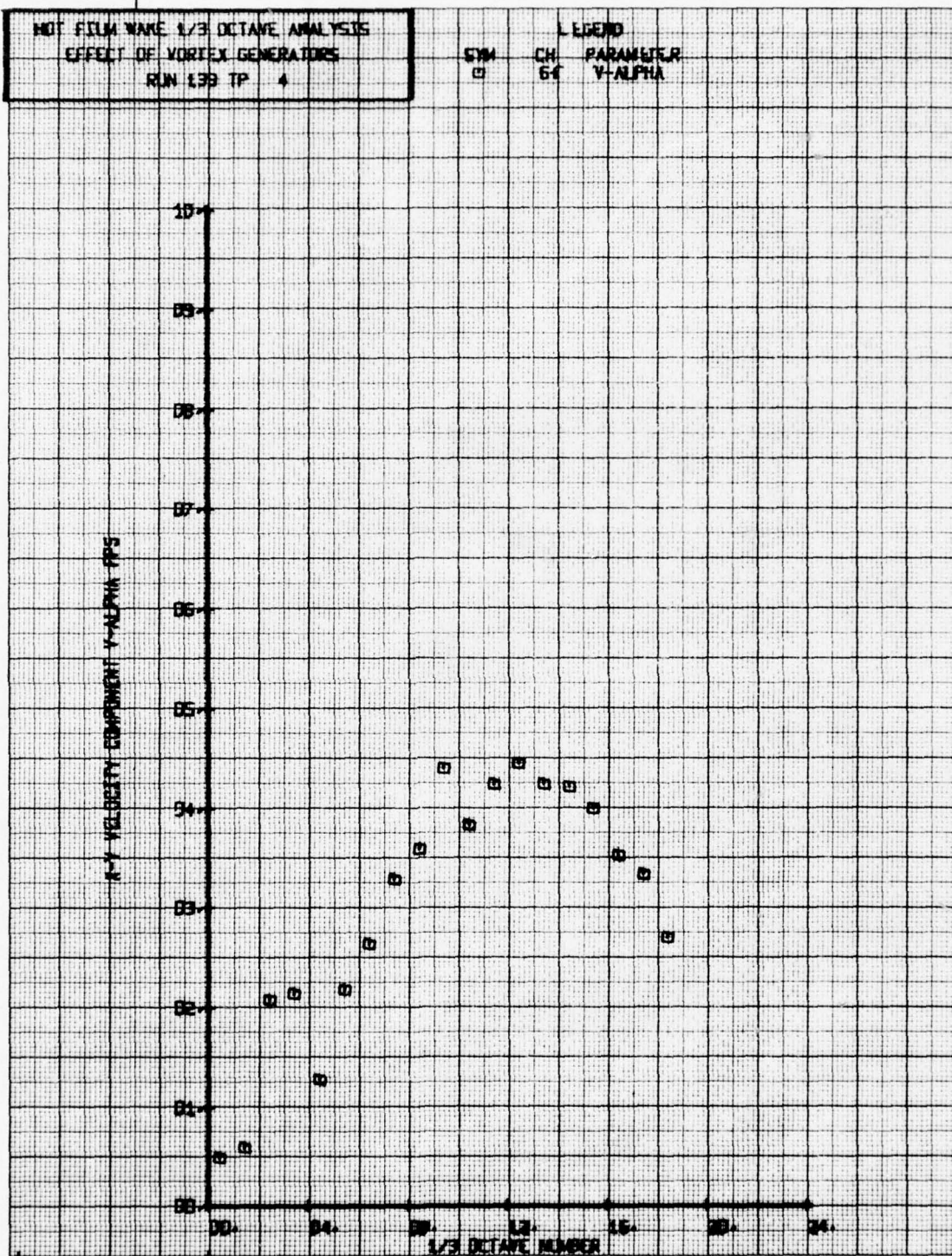
LEGEND
SYM CH PARAMETER
□ 66 V-ALPHA

V-ALPHA COMPONENT V-ALPHA FPS



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 4

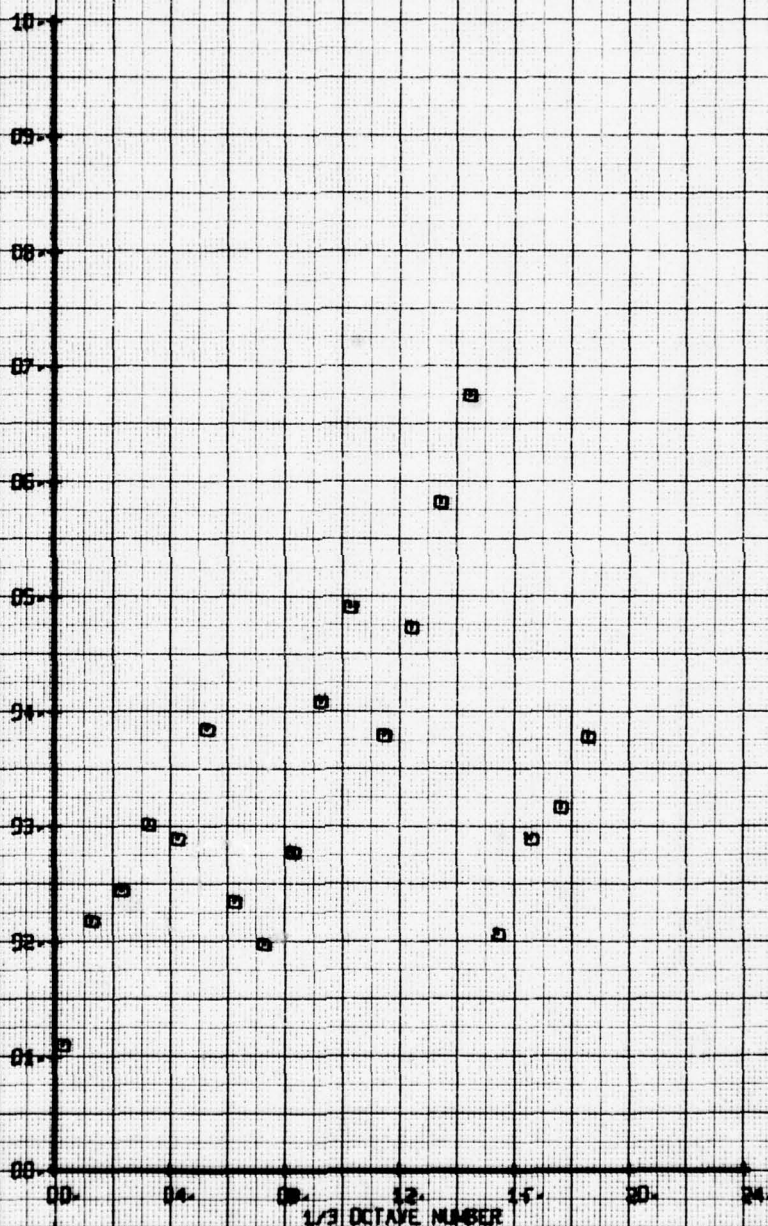
LEGEND
SYM CH PARAMETER
□ 64 V-ALPHA

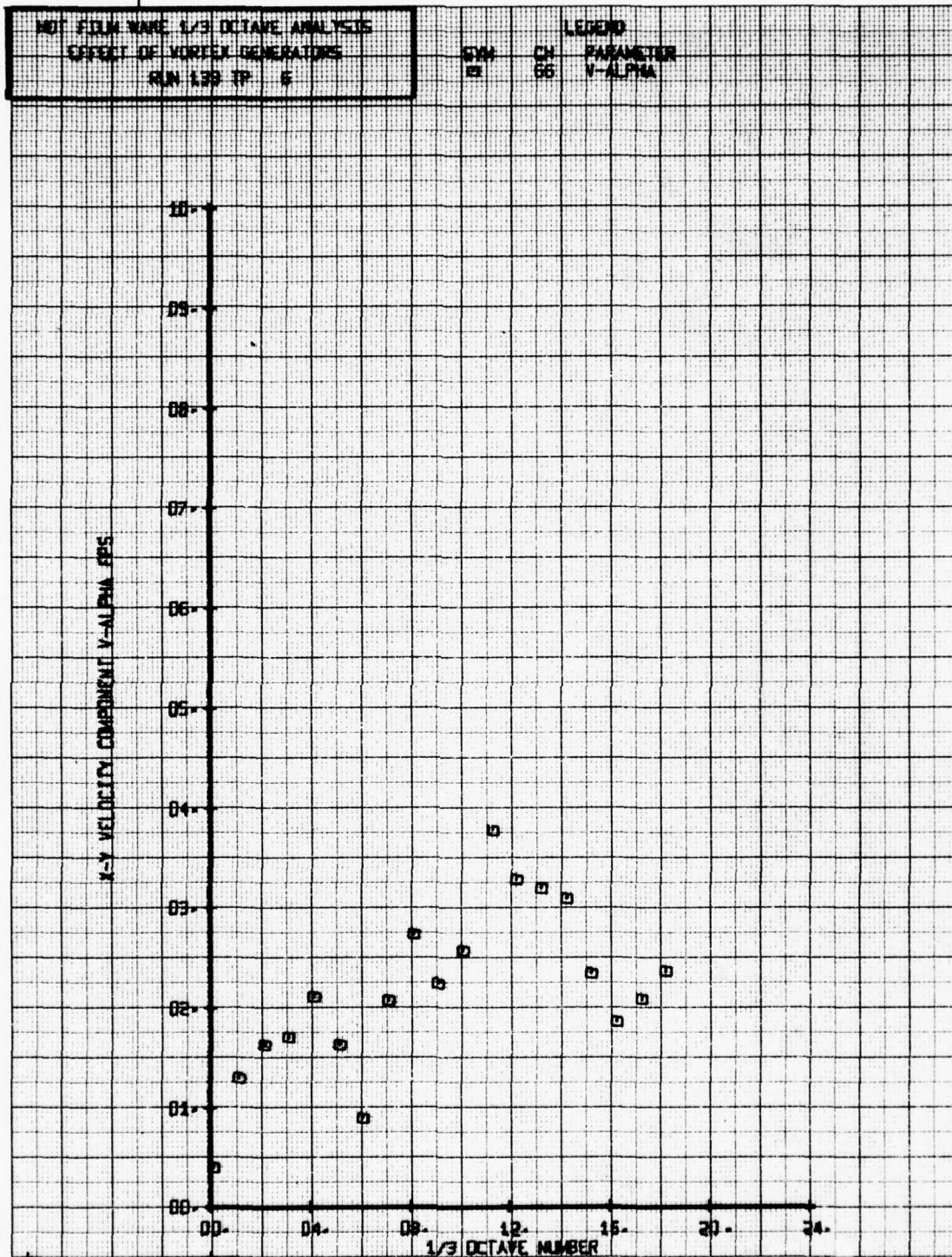


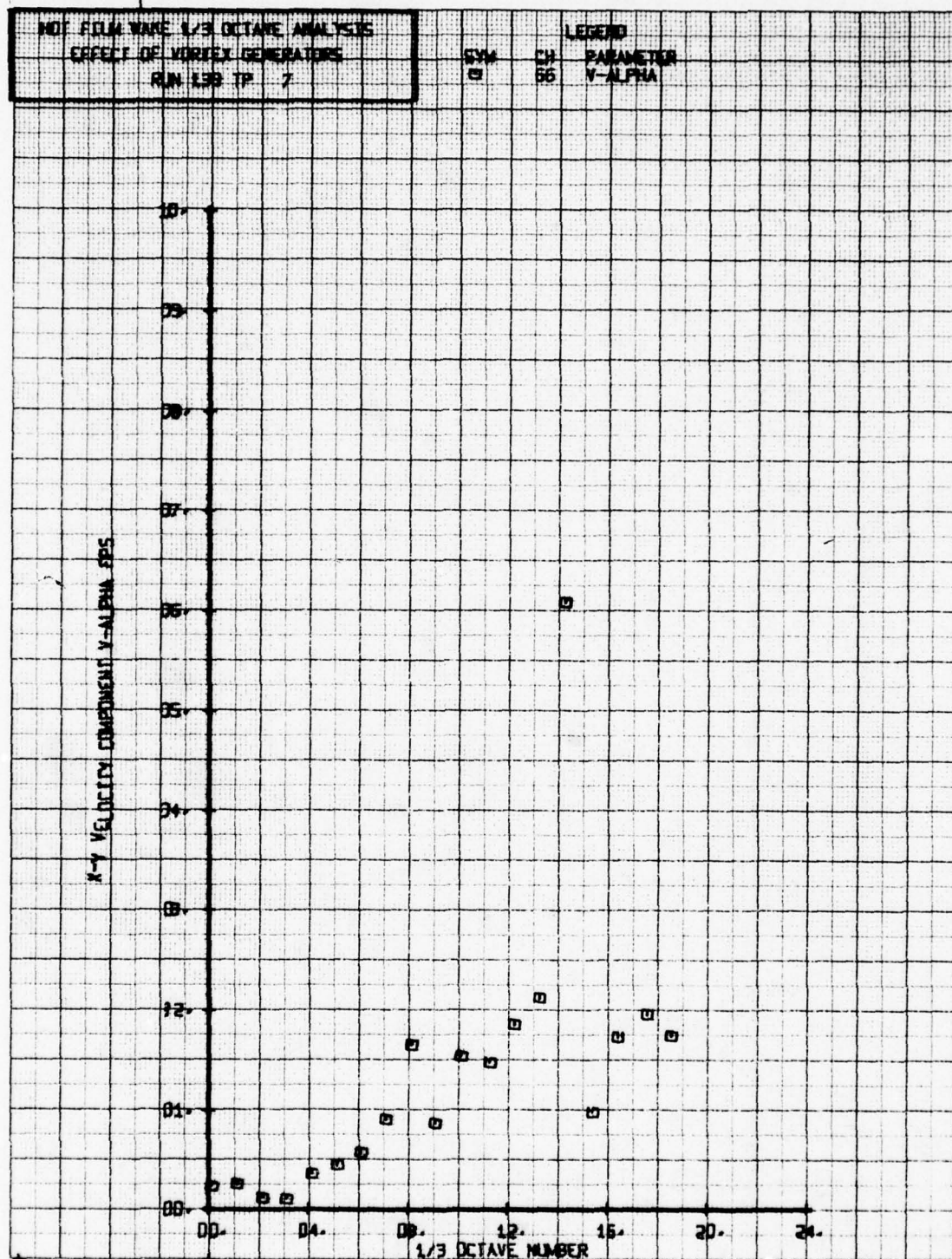
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP S

SYM CH PARAMETER
□ 66 Y-ALPHA

Y-Y VELOCITY COMPONENT Y-ALPHA FPS







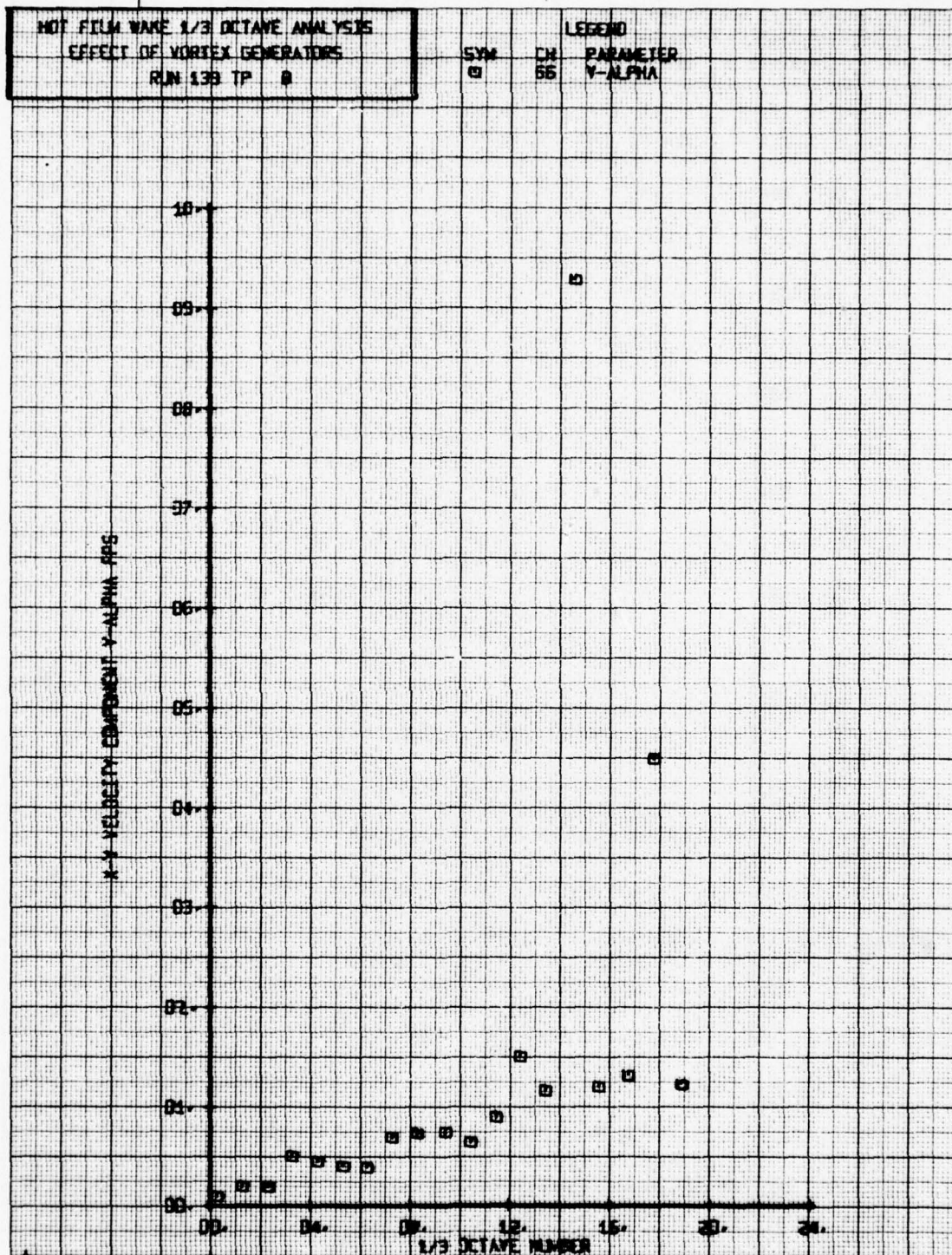
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 138 TP 8

SYM
□

CN
56

LEGEND
PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



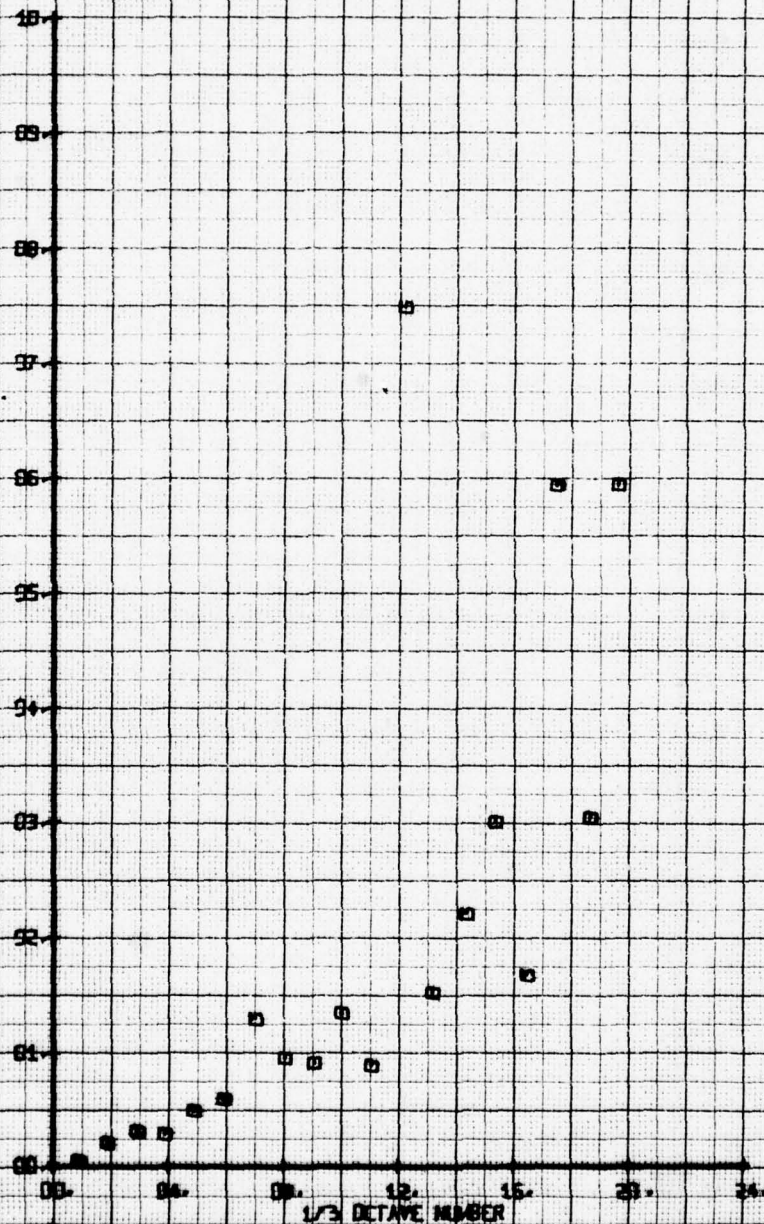
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EFFECT OF VORTEX GENERATORS
RUN 133 TP 9

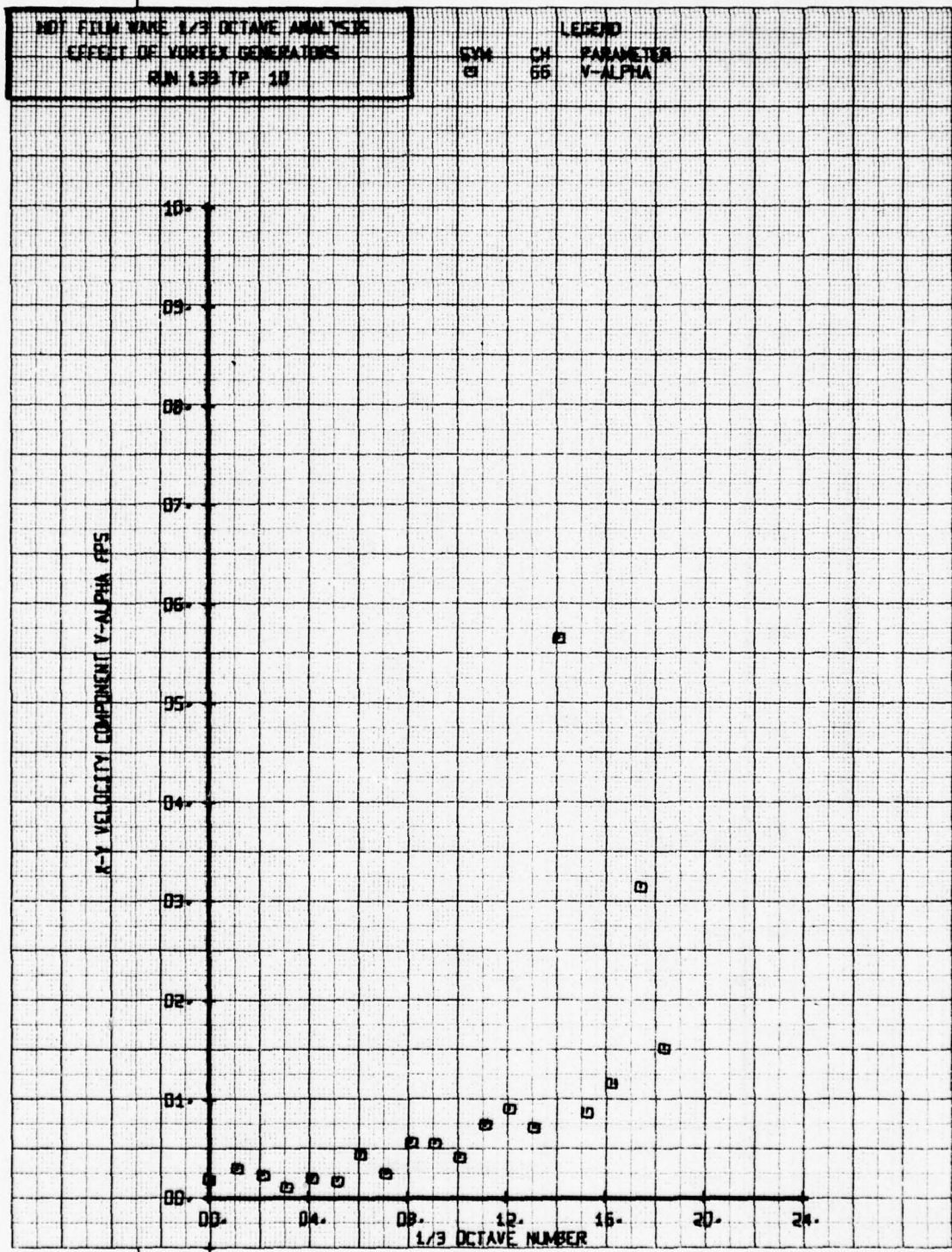
SYM
□

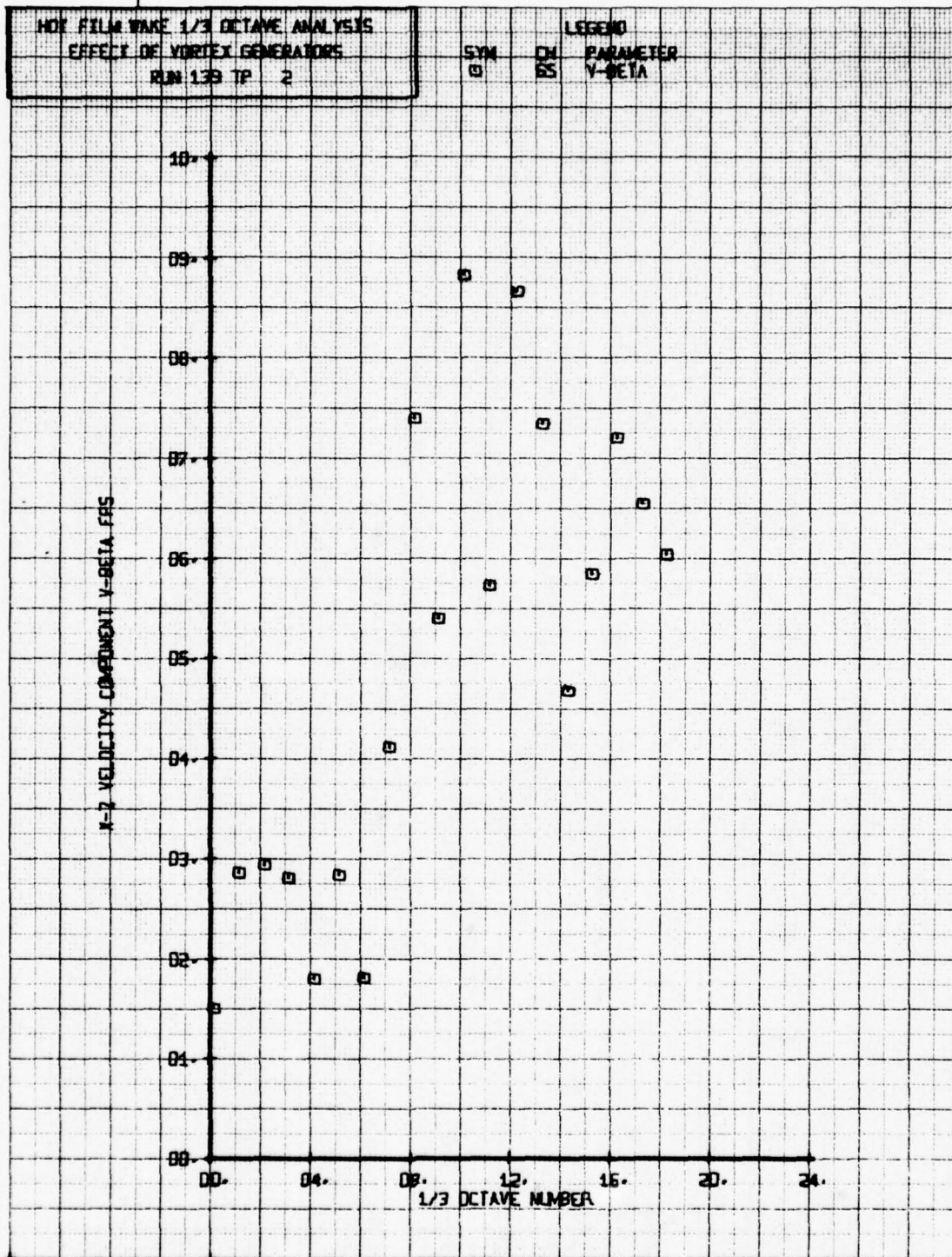
CH
66

LEGEND
PARAMETER
V-ALPHA

U-V VELOCITY COMPONENT V-ALPHA FPS







NOX FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 3

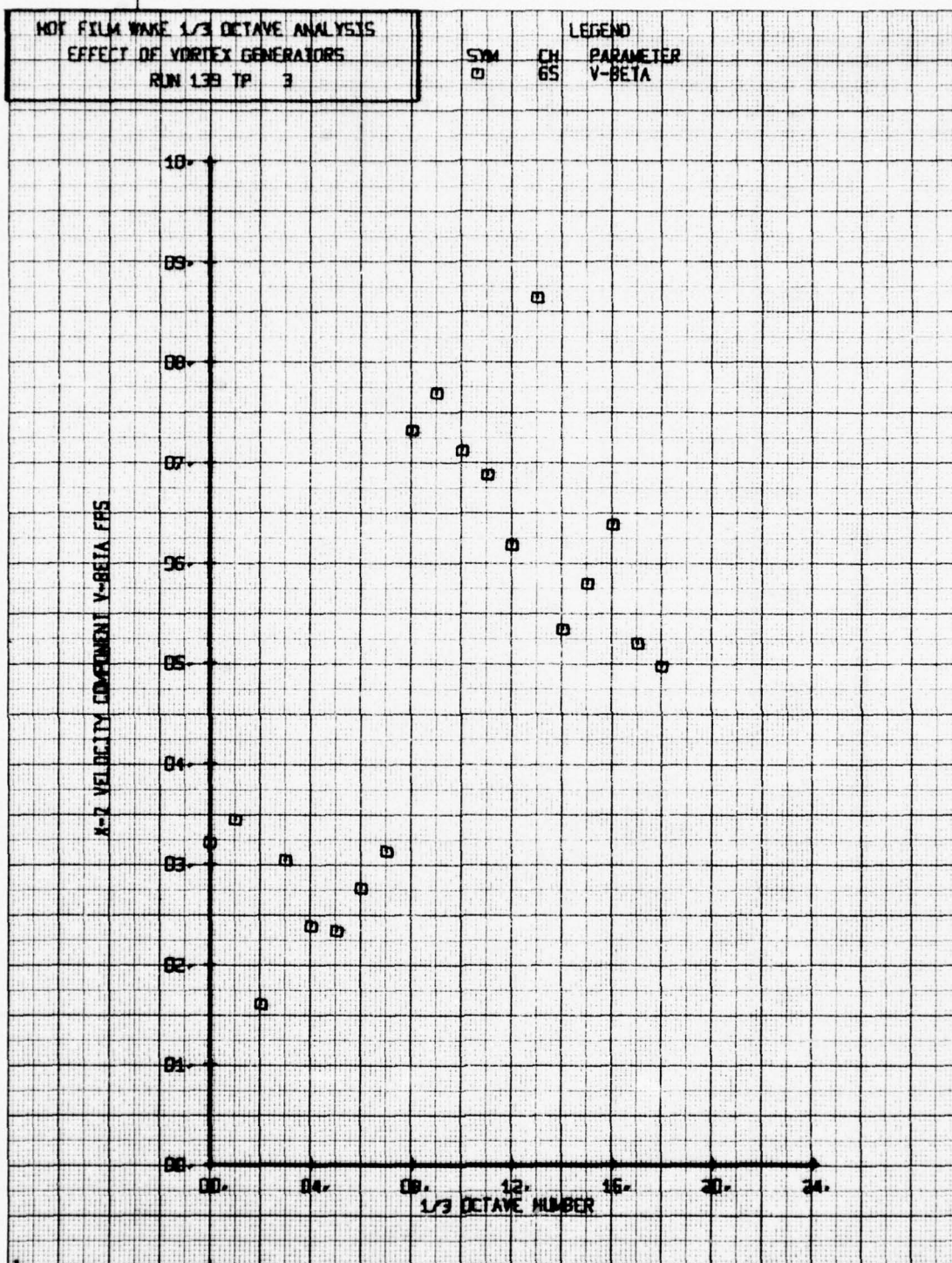
SYM
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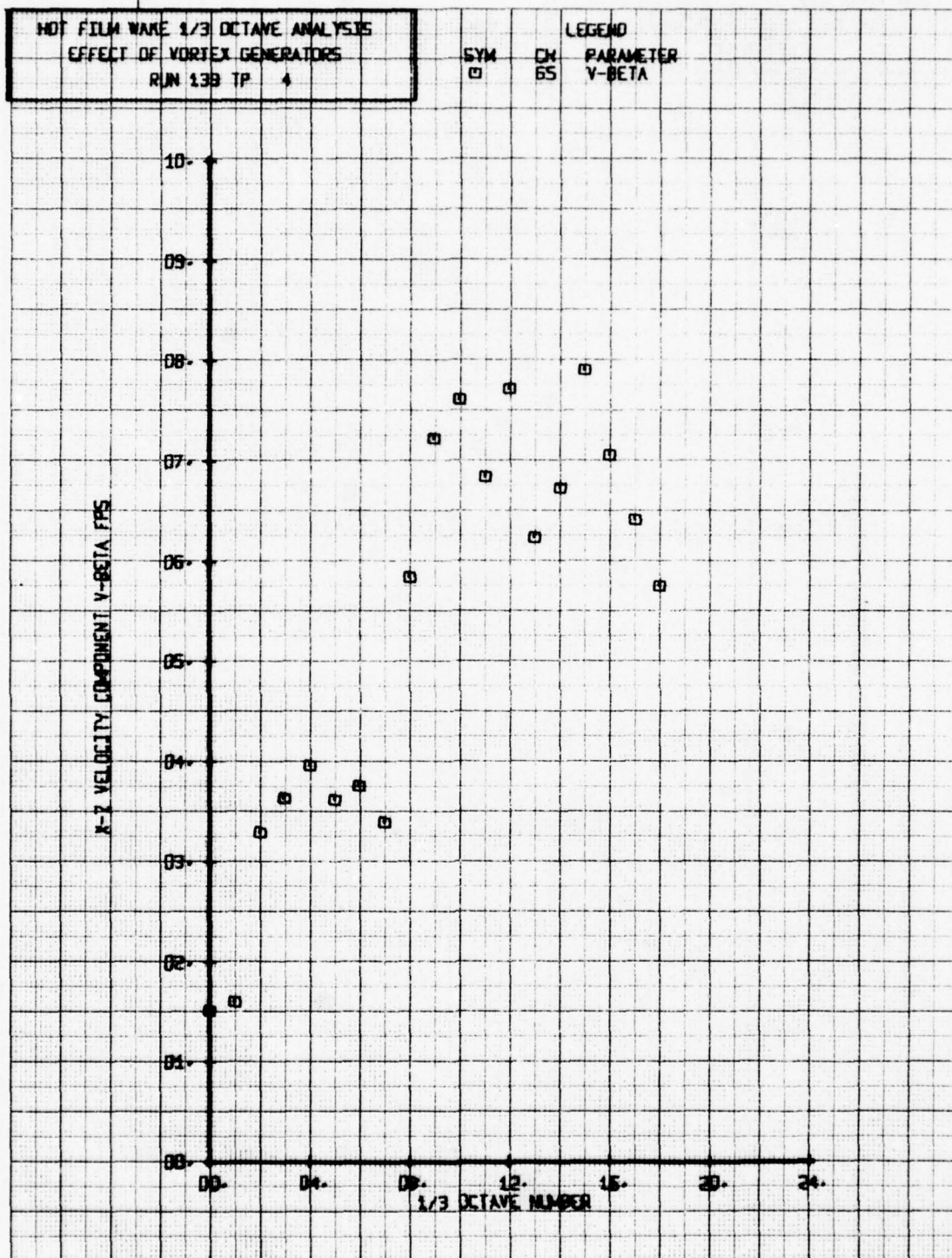
CH
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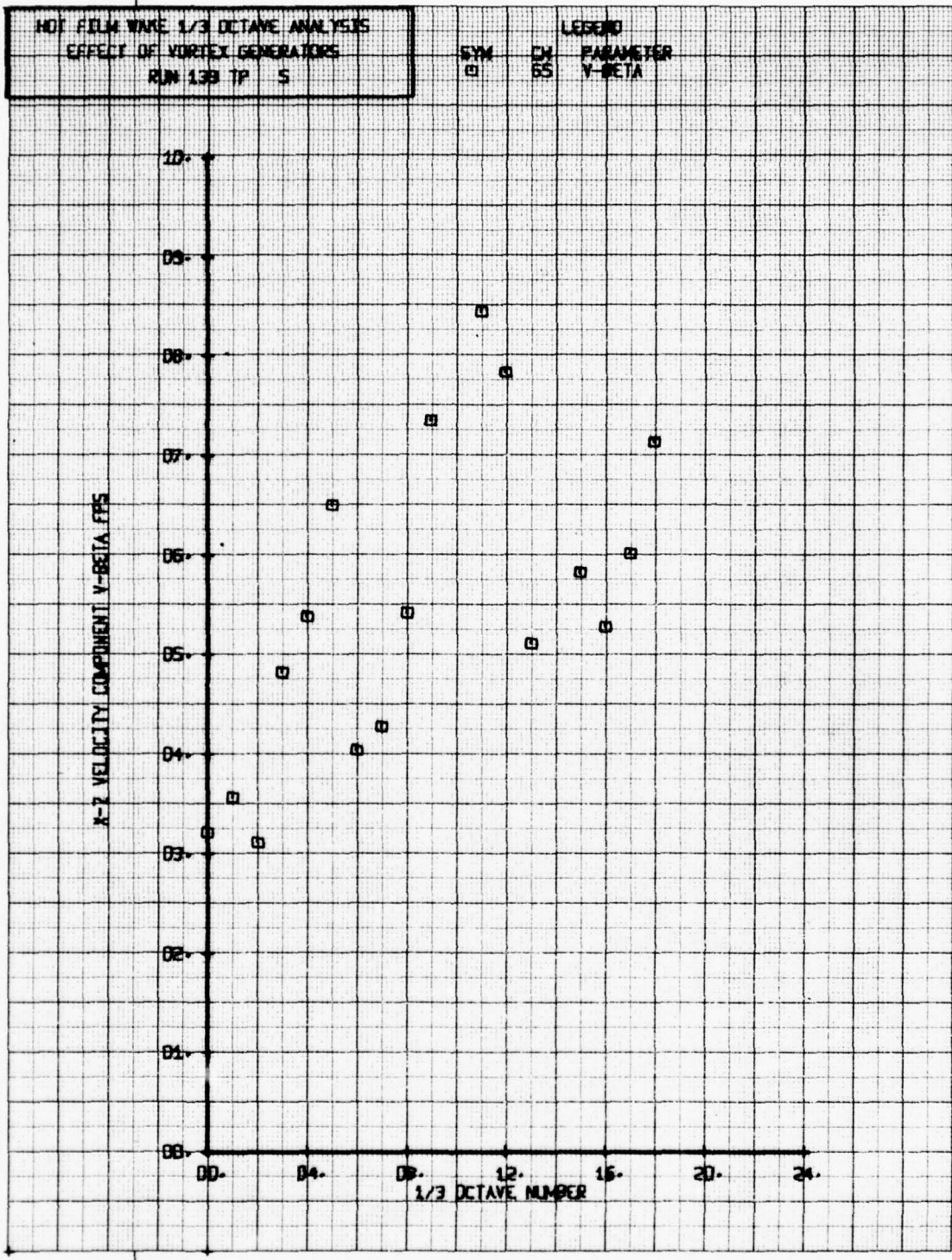
LEGEND
PARAMETER
V-BETA

X-2 VELOCITY COMPONENT V-BETA FBS

1/3 OCTAVE NUMBER







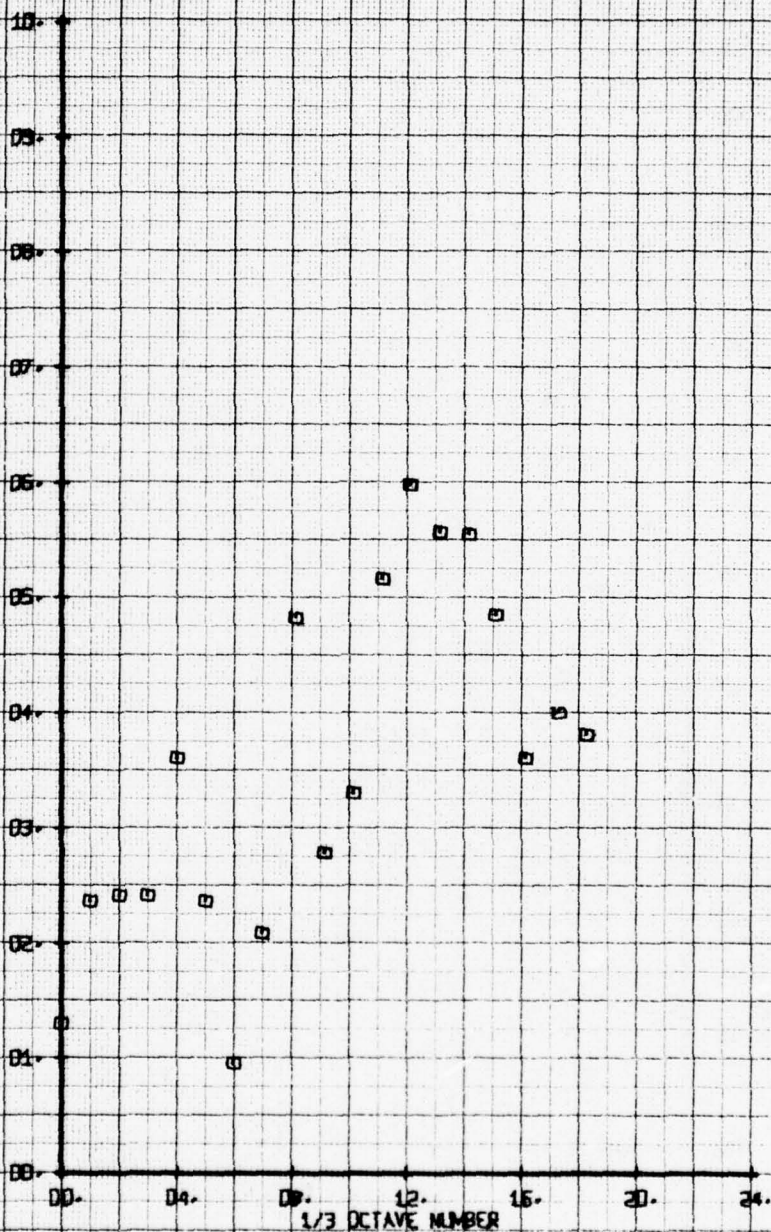
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 6

SYM
□

DM
65

LEGEND
PARAMETER
V-BETA

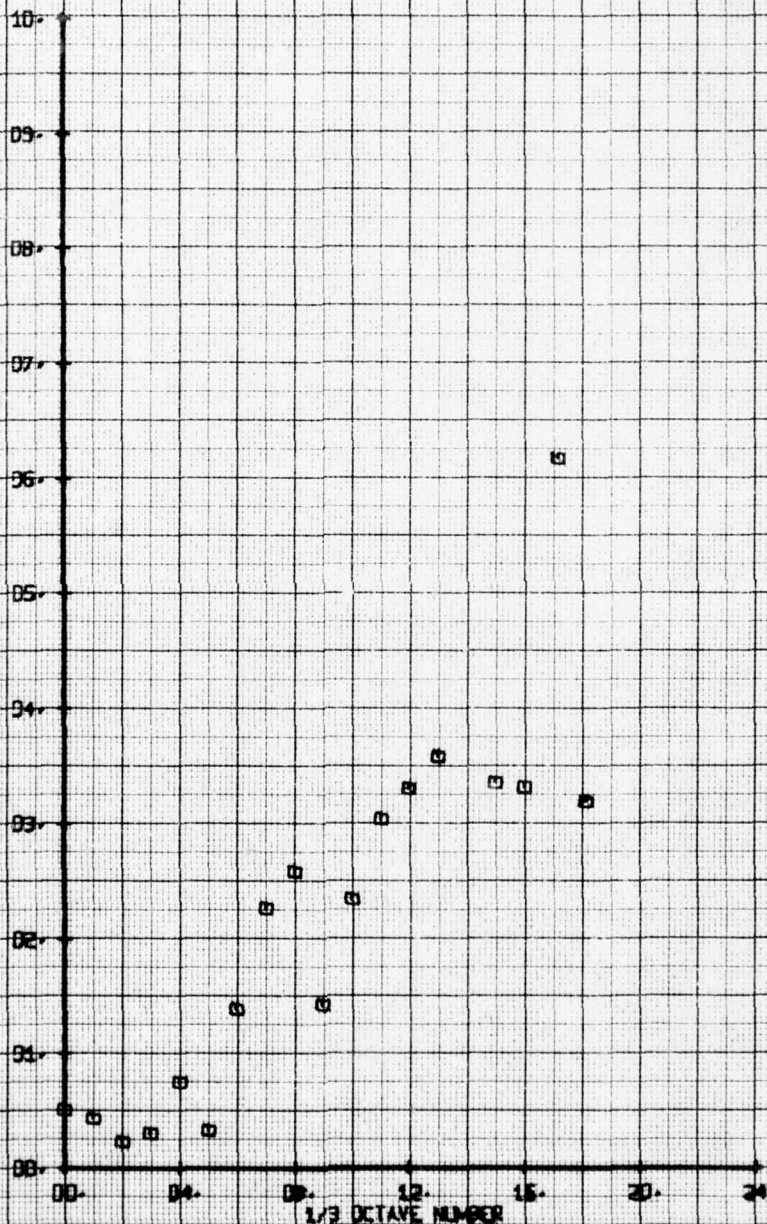
V-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 7

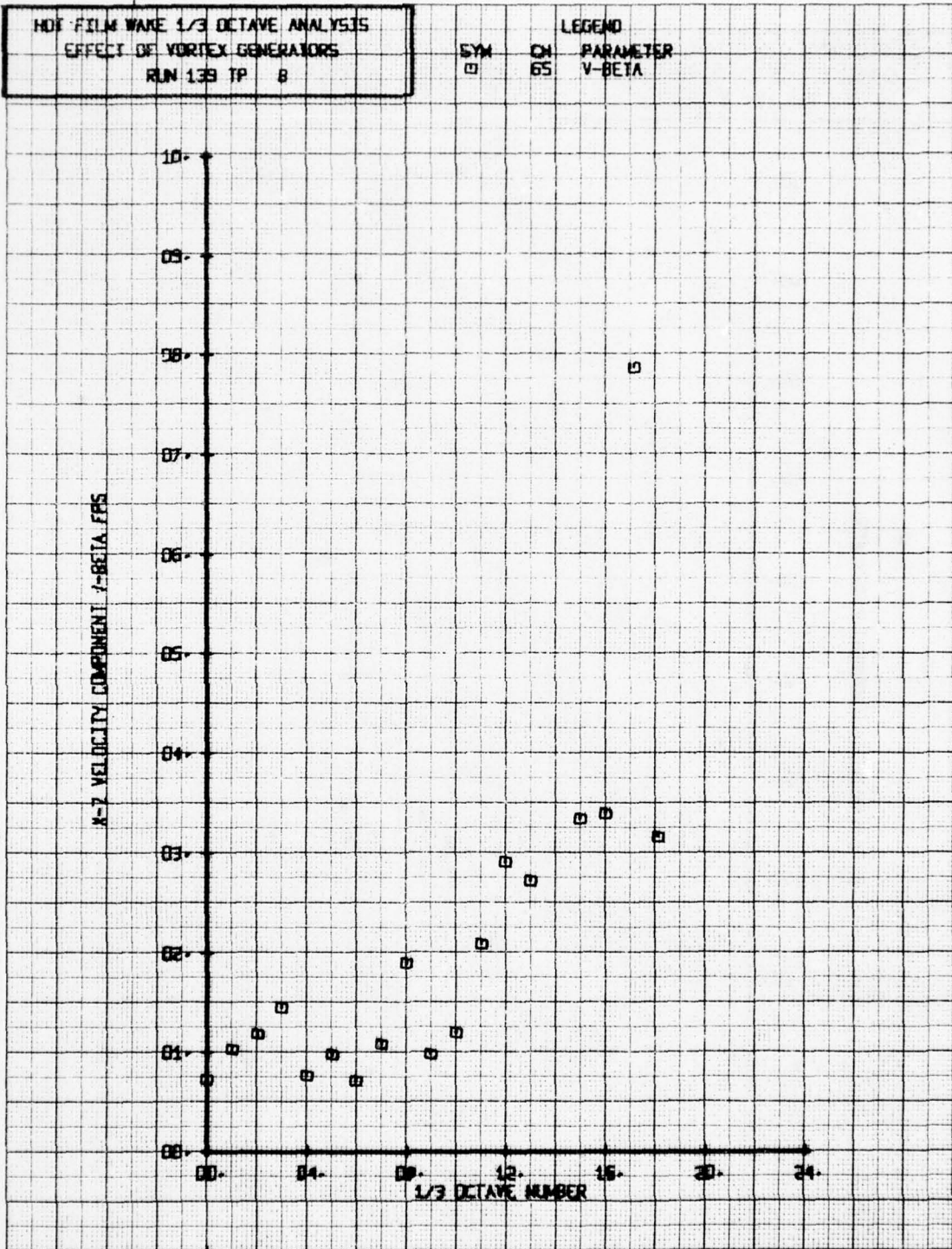
LEGEND
SYM CH PARAMETER
□ 65 V-BETA

N-7 VELOCITY COMPONENT V-BETA FPS



HDI FILM WAKE 1/3 OCTAVE ANALYSIS
 EFFECT OF VORTEX GENERATORS
 RUN 139 TP 8

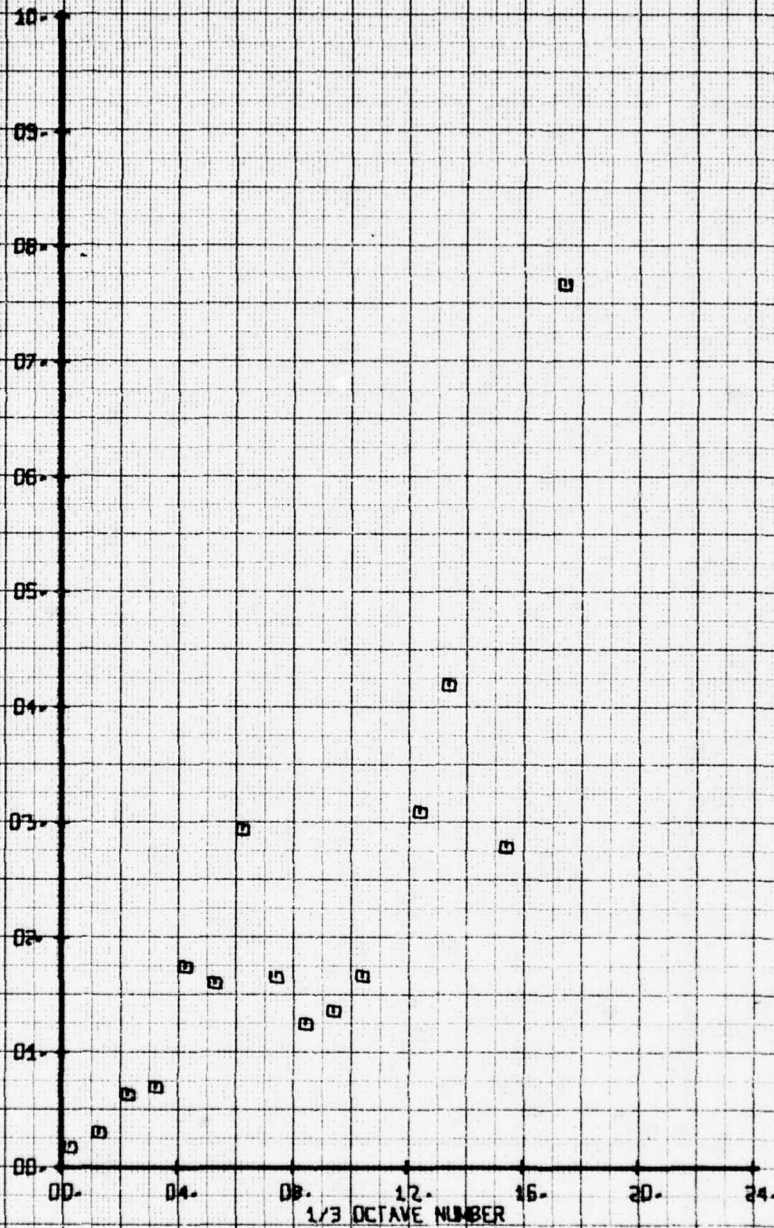
LEGEND
 CH 65
 PARAMETER
 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 138 TP 9

SYM CH PARAMETER
□ 65 V-BETA

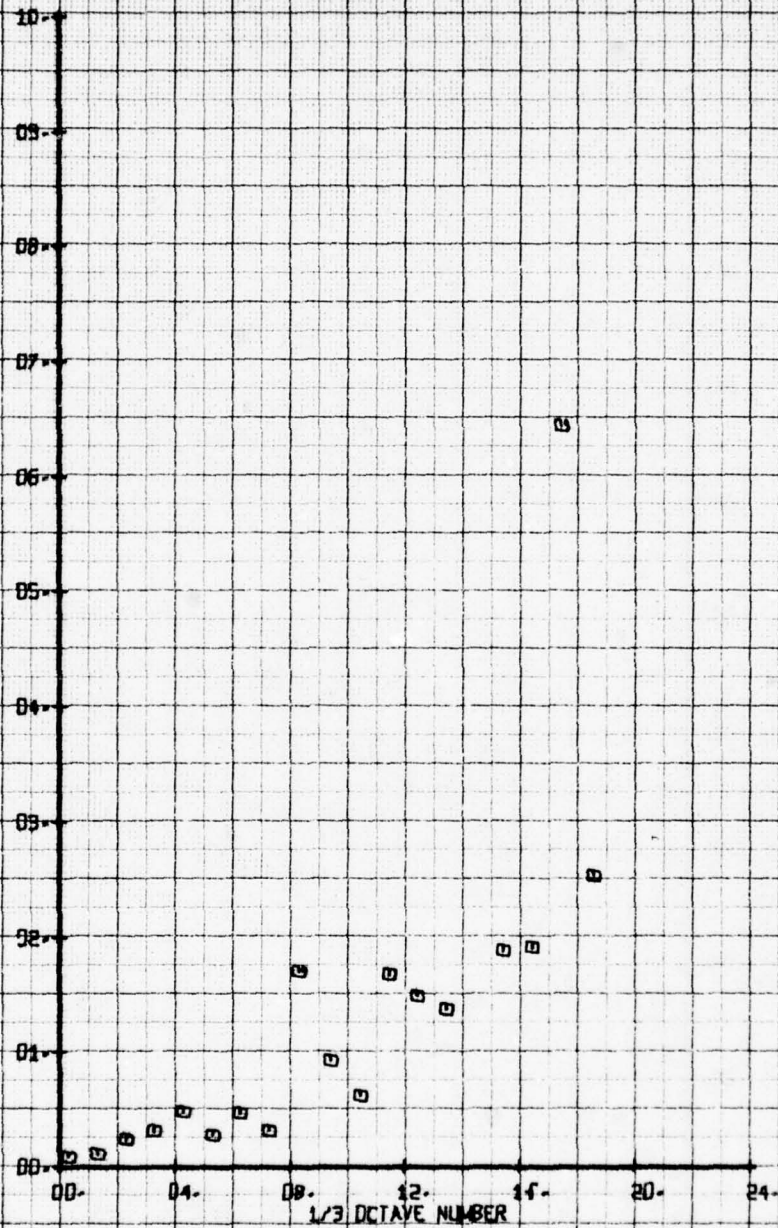
A-2 VELOCITY COMPONENT V-BETA FFS



NOI FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF VORTEX GENERATORS
RUN 139 TP 10

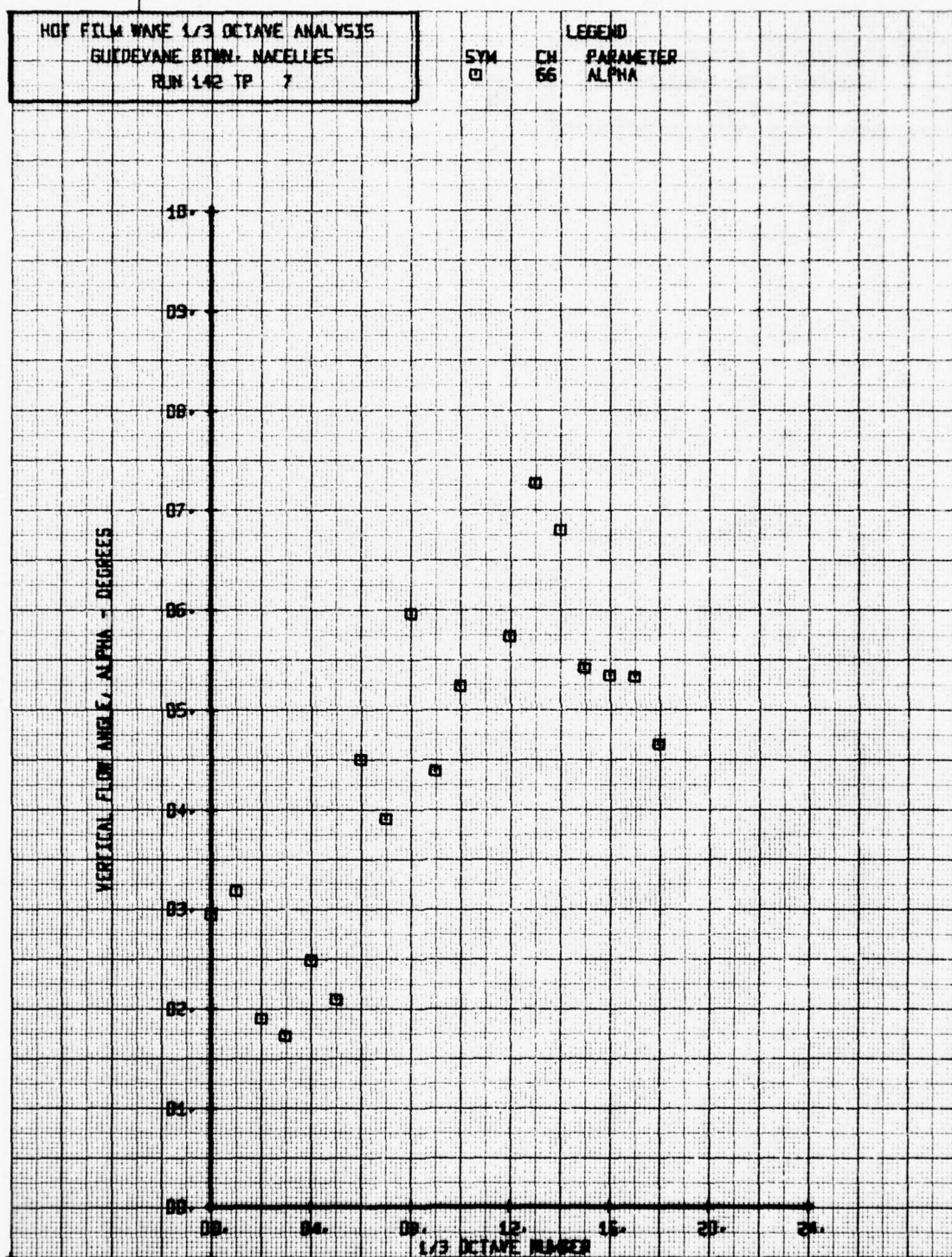
LEGEND
GWN CH PARAMETER
6 65 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNN. MACELLIES
 RUN 142 TP 7

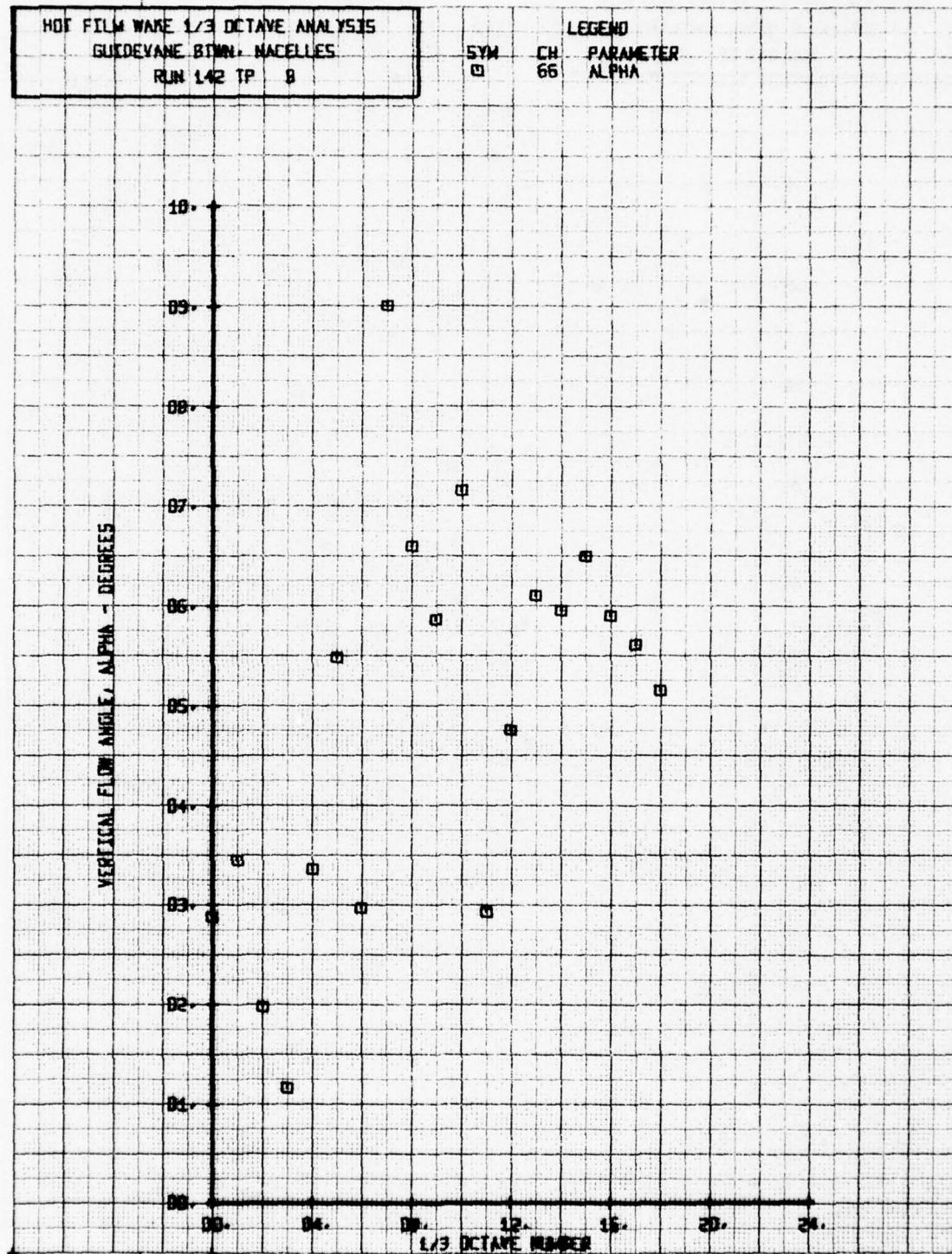
LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA

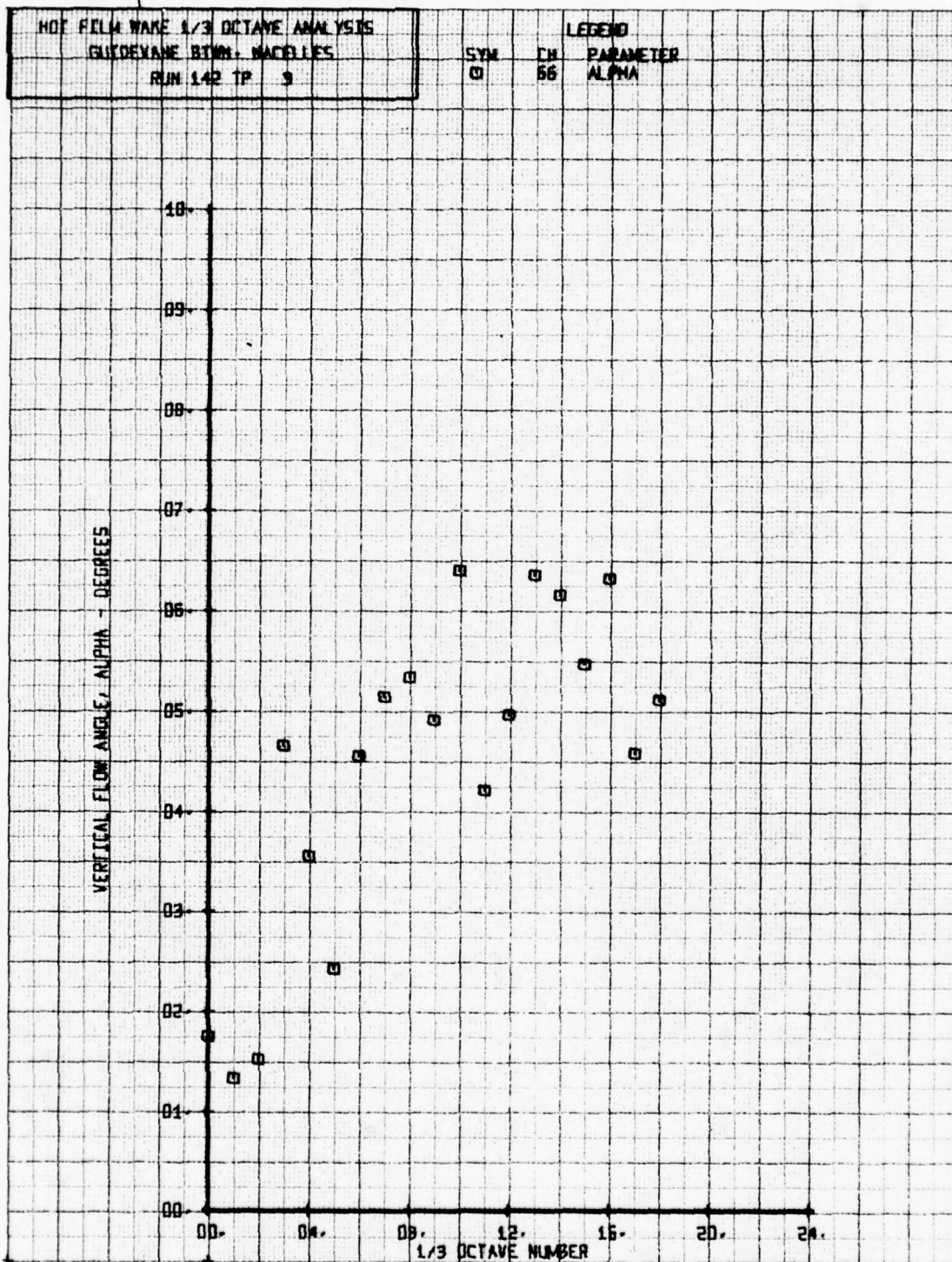


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTMM, MACELLES
 RUN 142 TP 8

SYN CH PARAMETER
 0 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

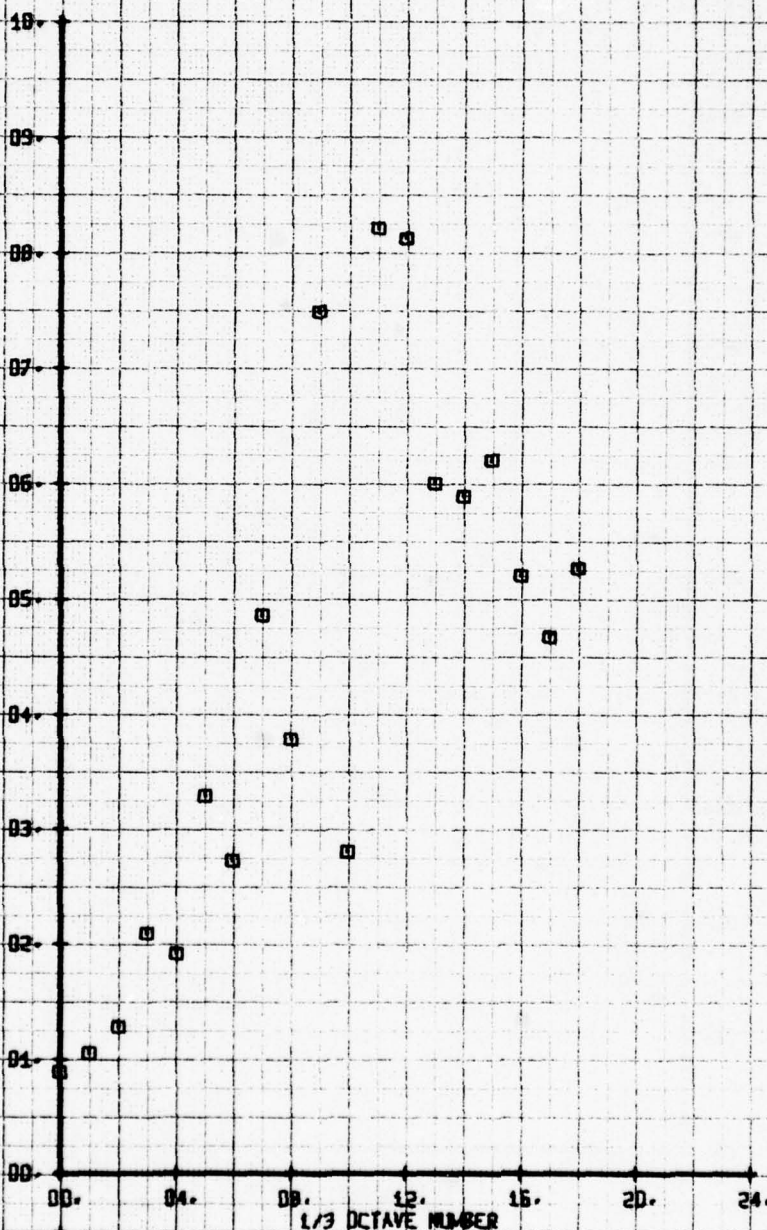




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTNN. MACELLES
RUN 142 TP 10

SYN CH
66
LEGEND
PARAMETER
ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



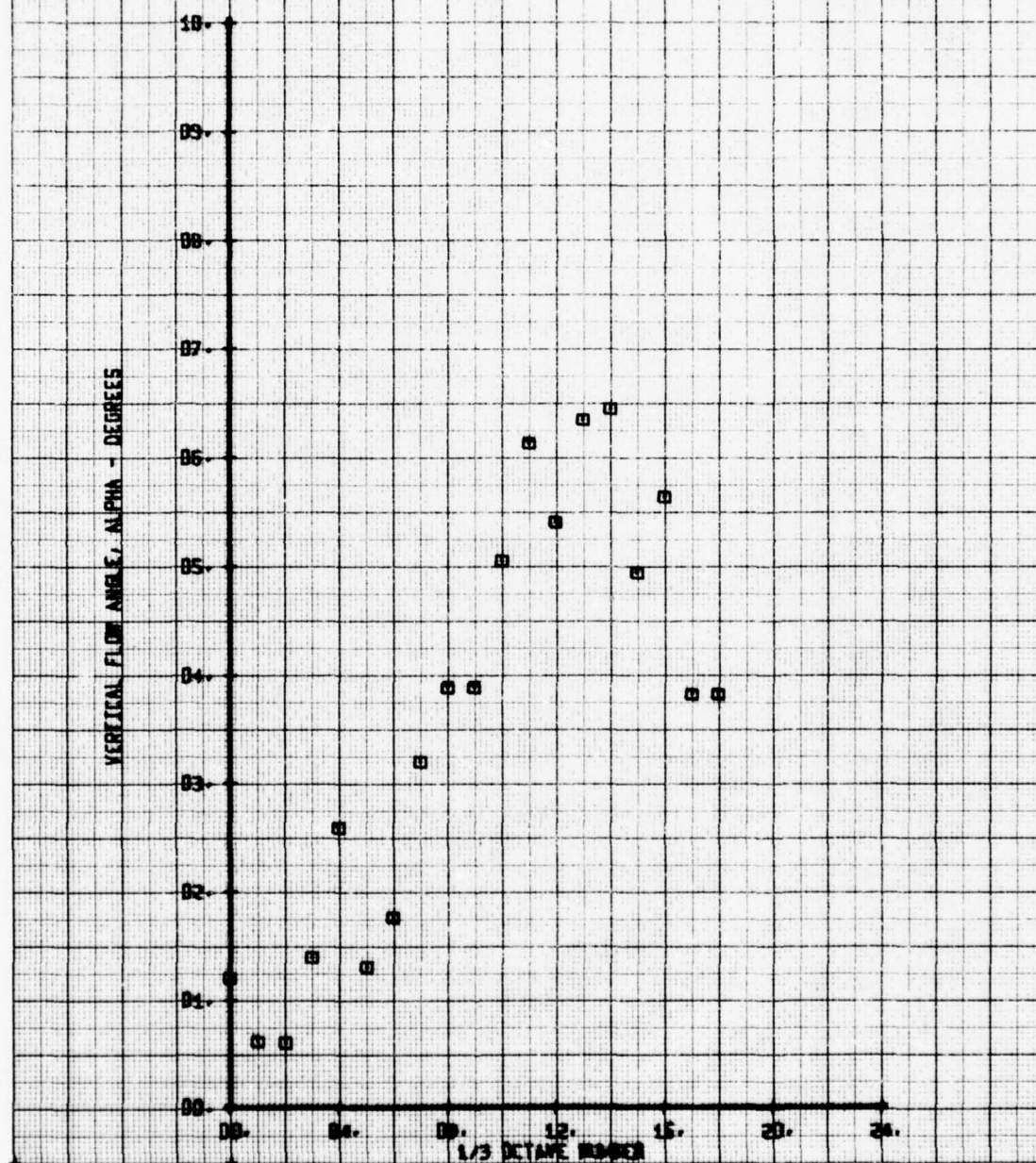
NOY FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNR, MACELLES
 RUN 142 TP 11

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

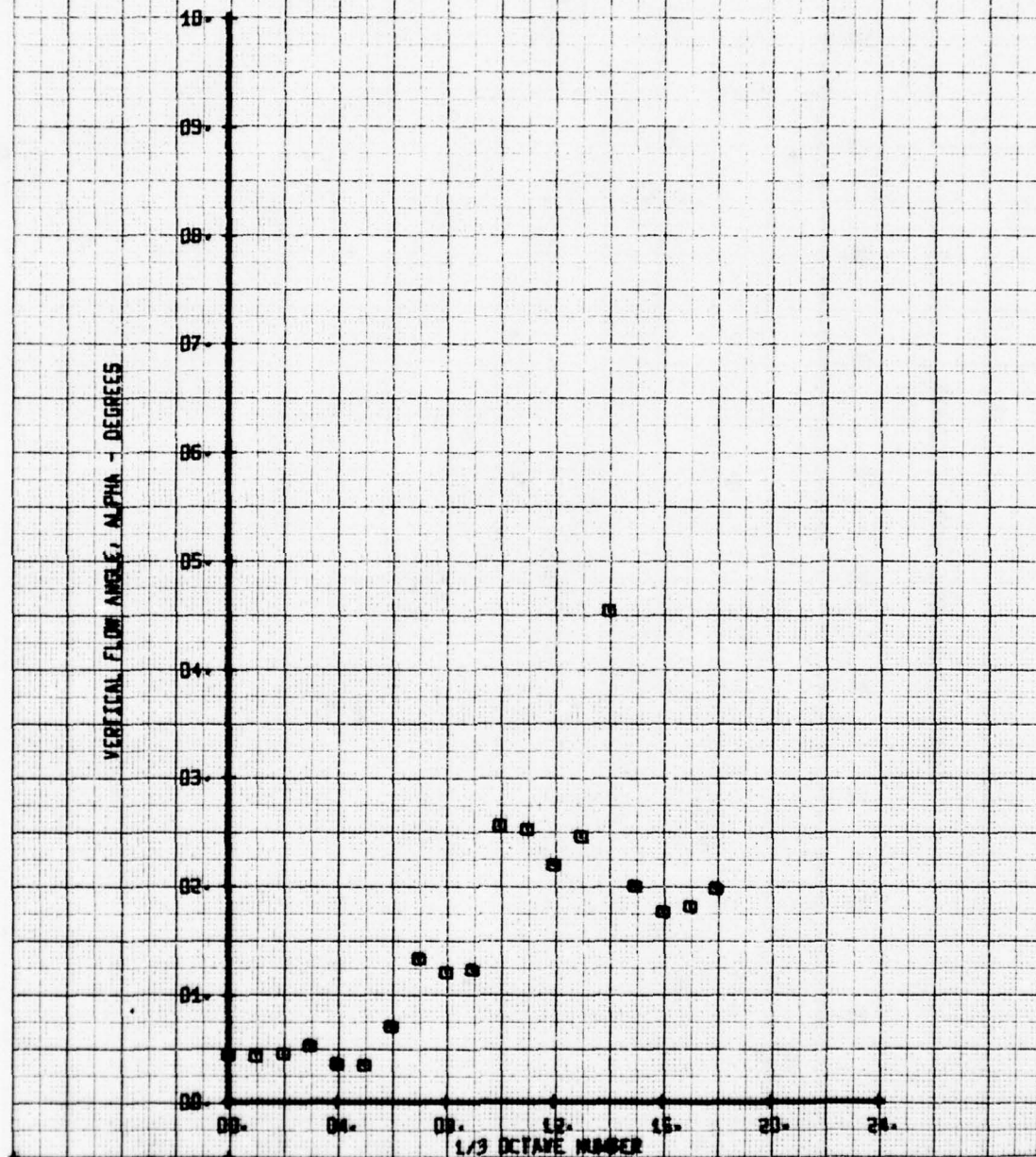
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDOVANE BTWN. MACELLES
 RUN 142 TP 12

SYM CH
 0 66
 LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

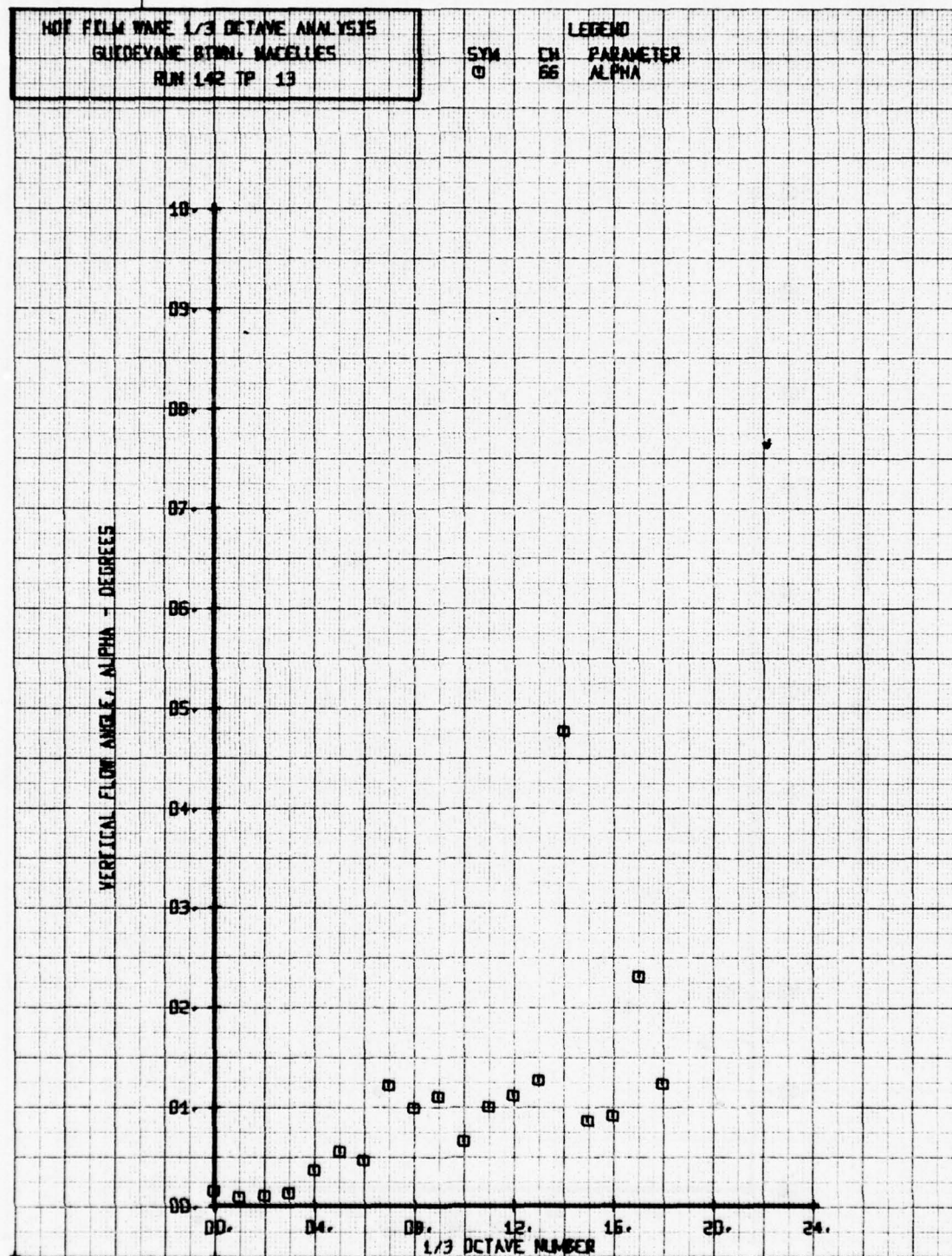


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTNN. NACELLES
RUN 142 TP 13

SYM
O

LEGEND
CH 66
PARAMETER
ALPHA

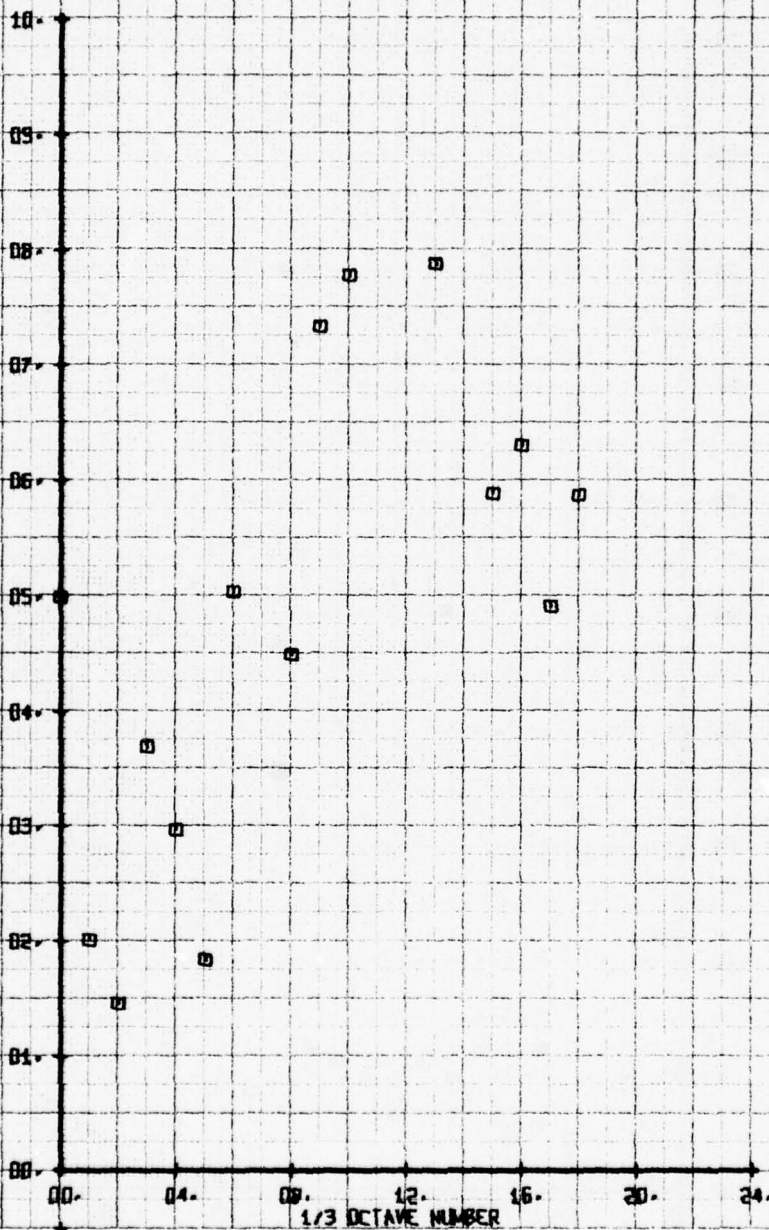
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 GUIDEWAVE BOWL NACELLES
 RUN 142 TP 7

SYN CH LEGEND
 0 65 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



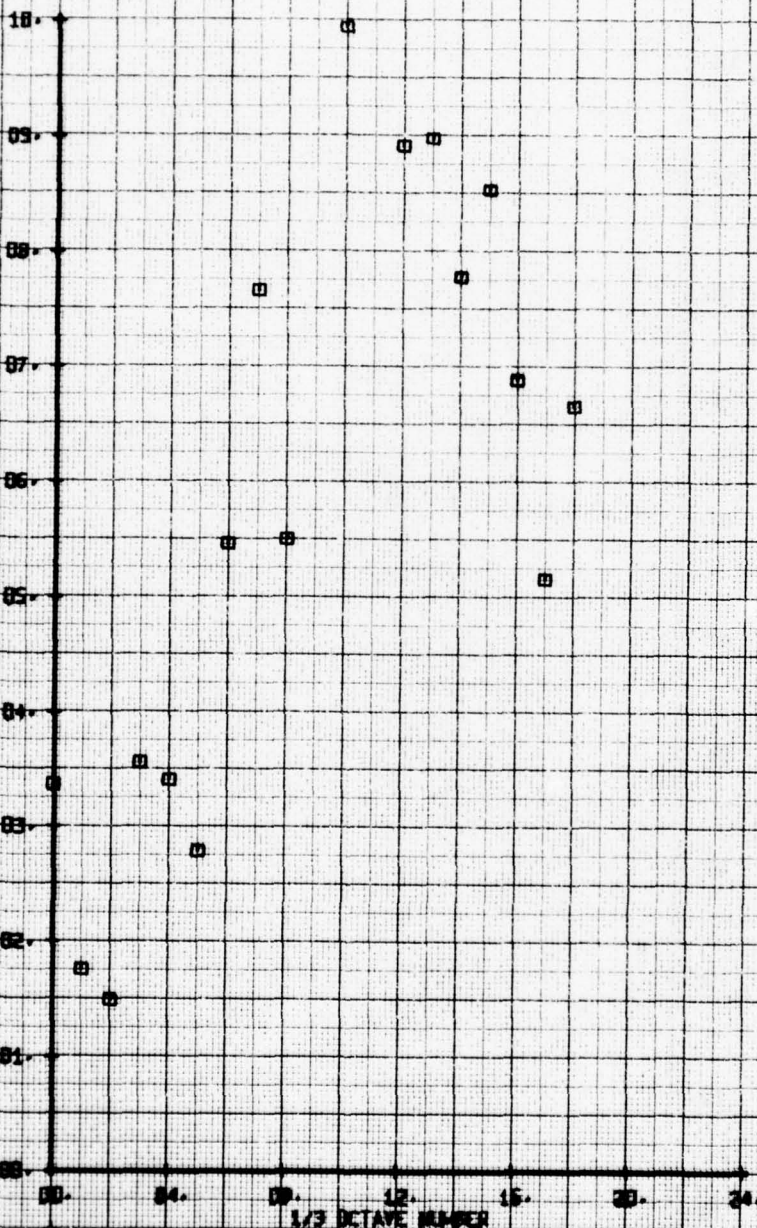
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNN. NACELLES
 RUN 142 TP 8

SYM
 □

CH
 65

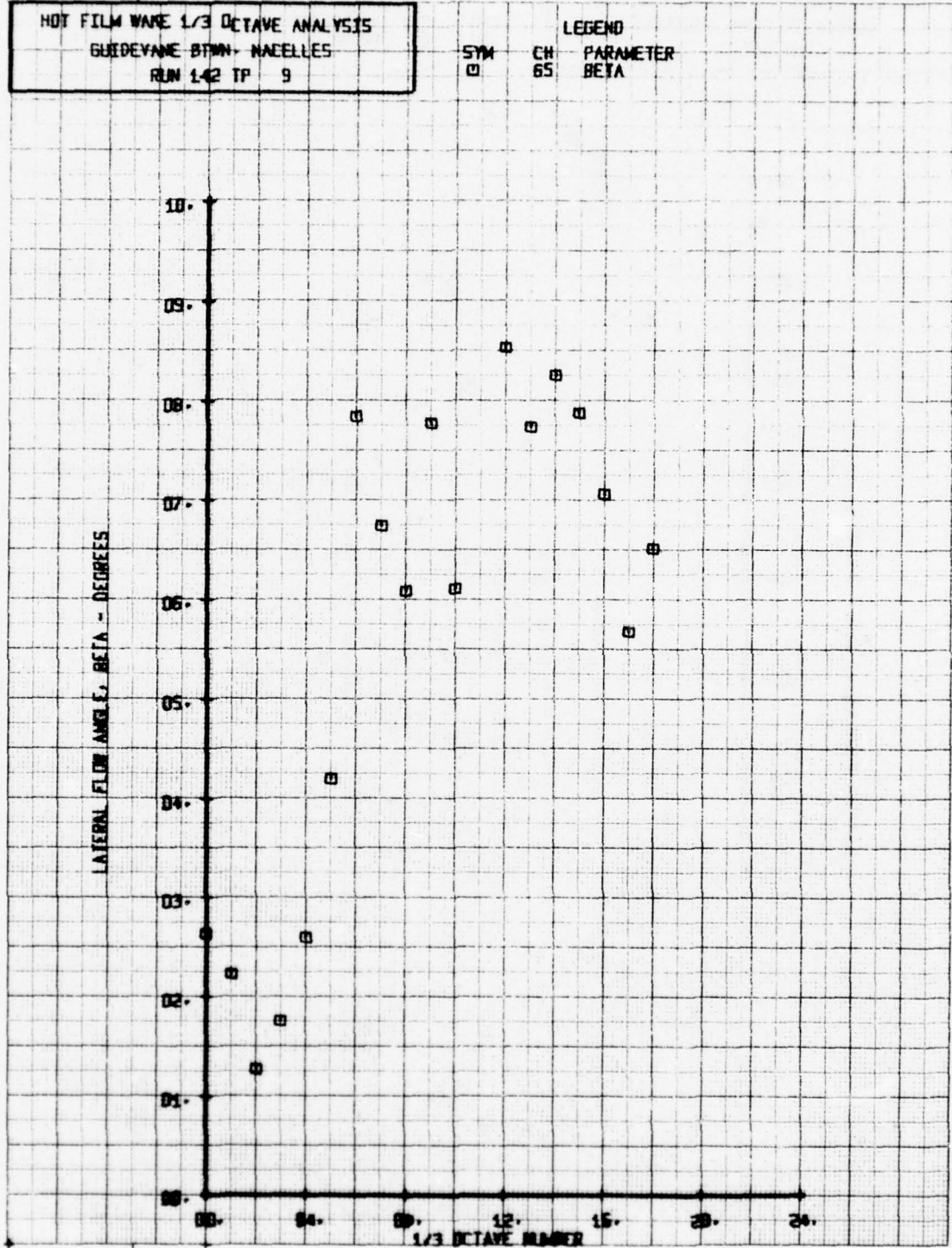
LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE β , DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUEDEVANE BTM - NAEELLES
 RUN 142 TP 9

LEGEND
 SYM CH PARAMETER
 □ 65 BETA



NOF FILM WAVE 1/3 OCTAVE ANALYSIS

GUIDEWAYE BYNN- NACELLES

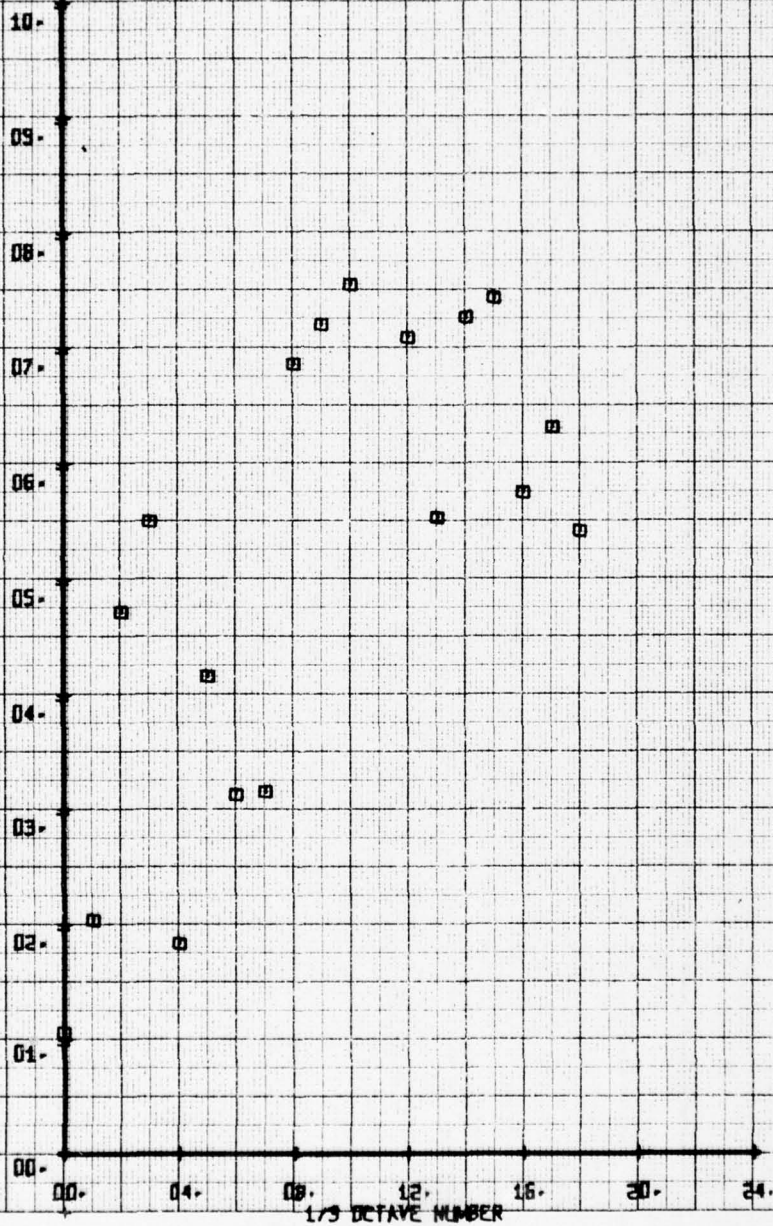
RUN 142 YP 10

SYM
□

CH
65

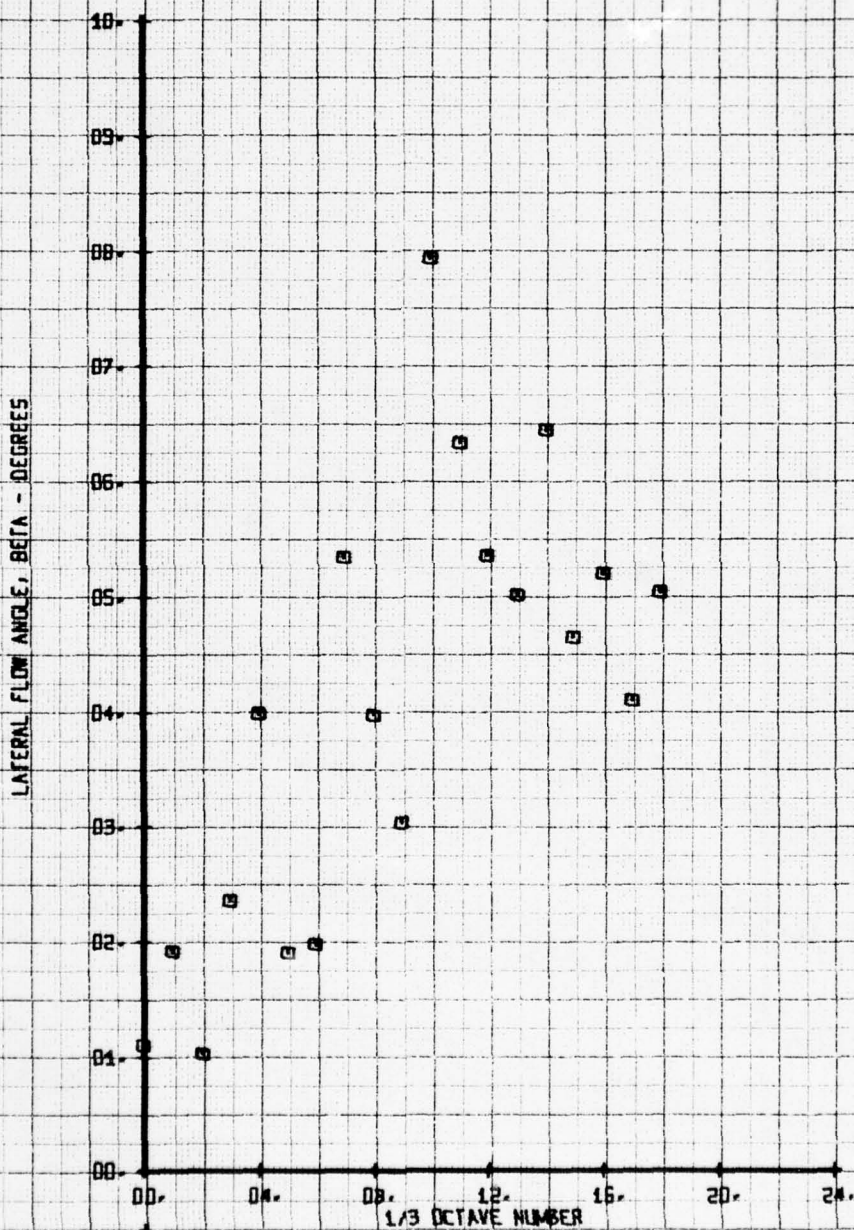
LEGEND
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



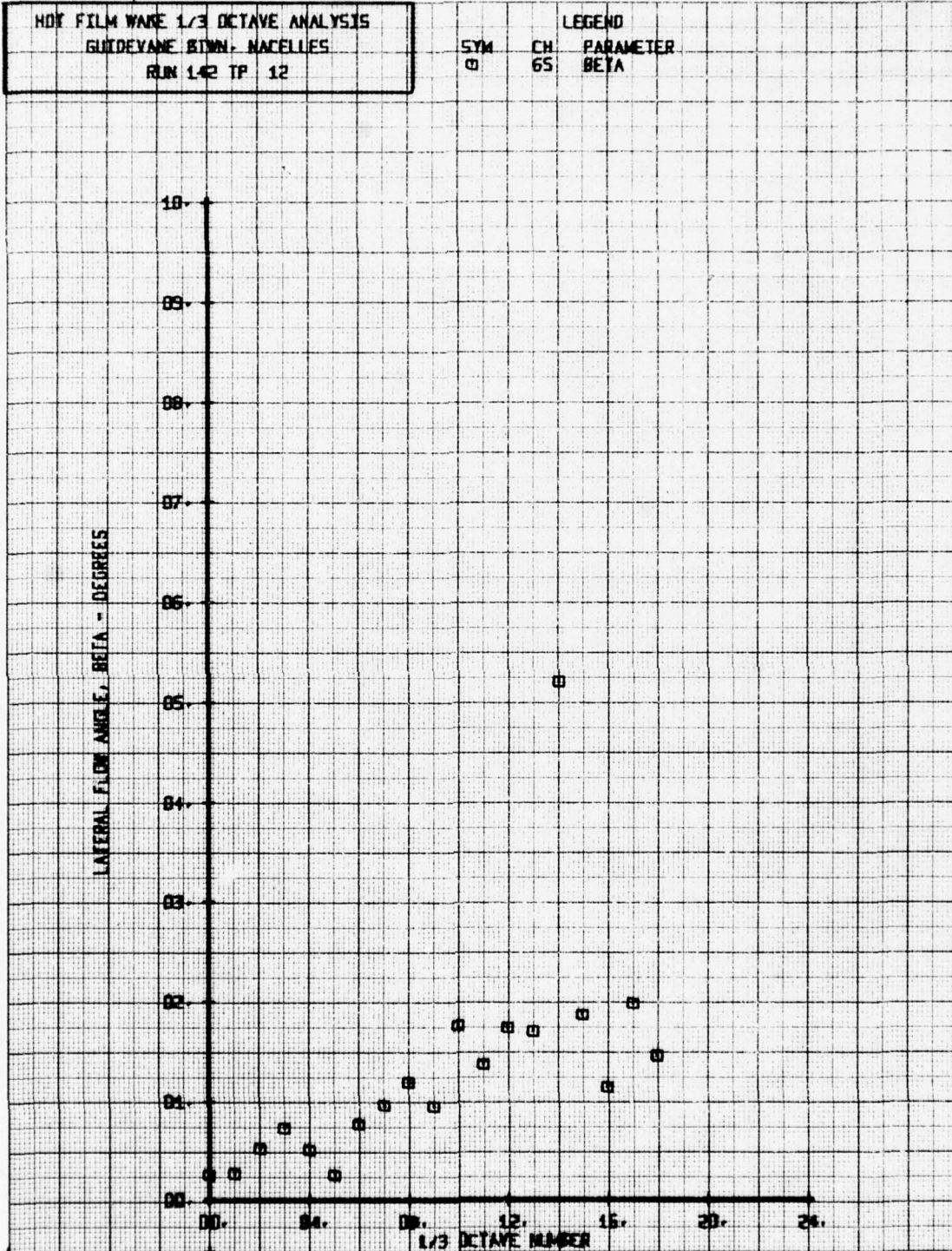
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BOWN. NACELLES
RUN 142 TP 11

LEGEND
SYM CH PARAMETER
Q 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTWN. NACELLES
 RUN 142 TP 12

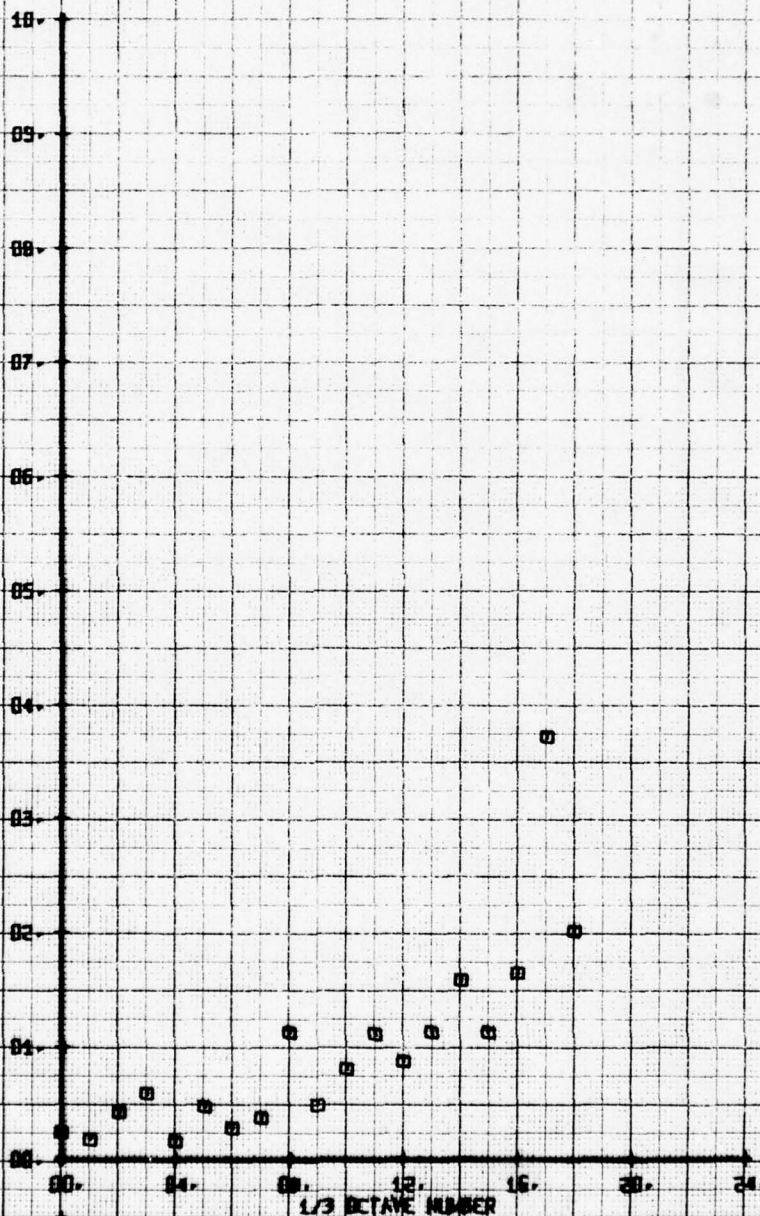
LEGEND
 SYM CH PARAMETER
 O 65 BETA



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 GLIDEWAYE BTHN. NACELLES
 RUN 142 TP 13

SYM	CH	LEGEND
□	65	PARAMETER BETA

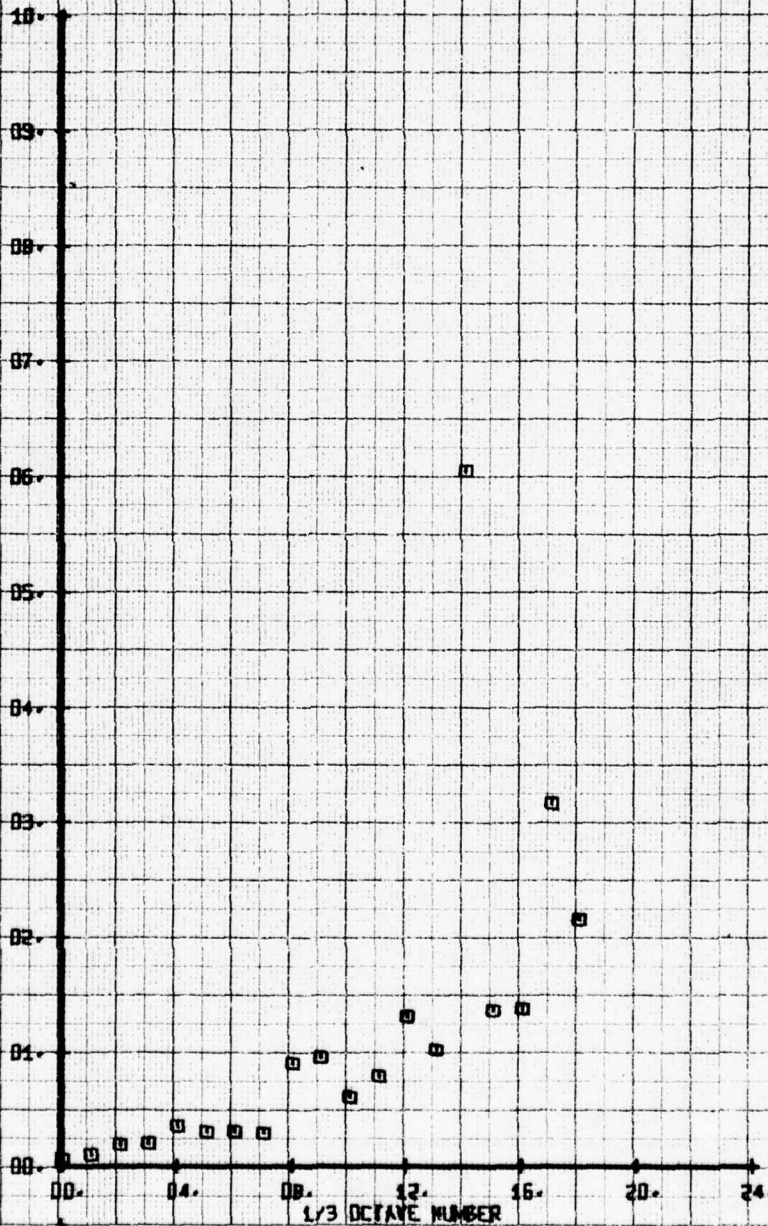
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WARE 1/3 OCTAVE ANALYSES
GUIDEVANE BOM. NACELLES
RUN 142 TP 14

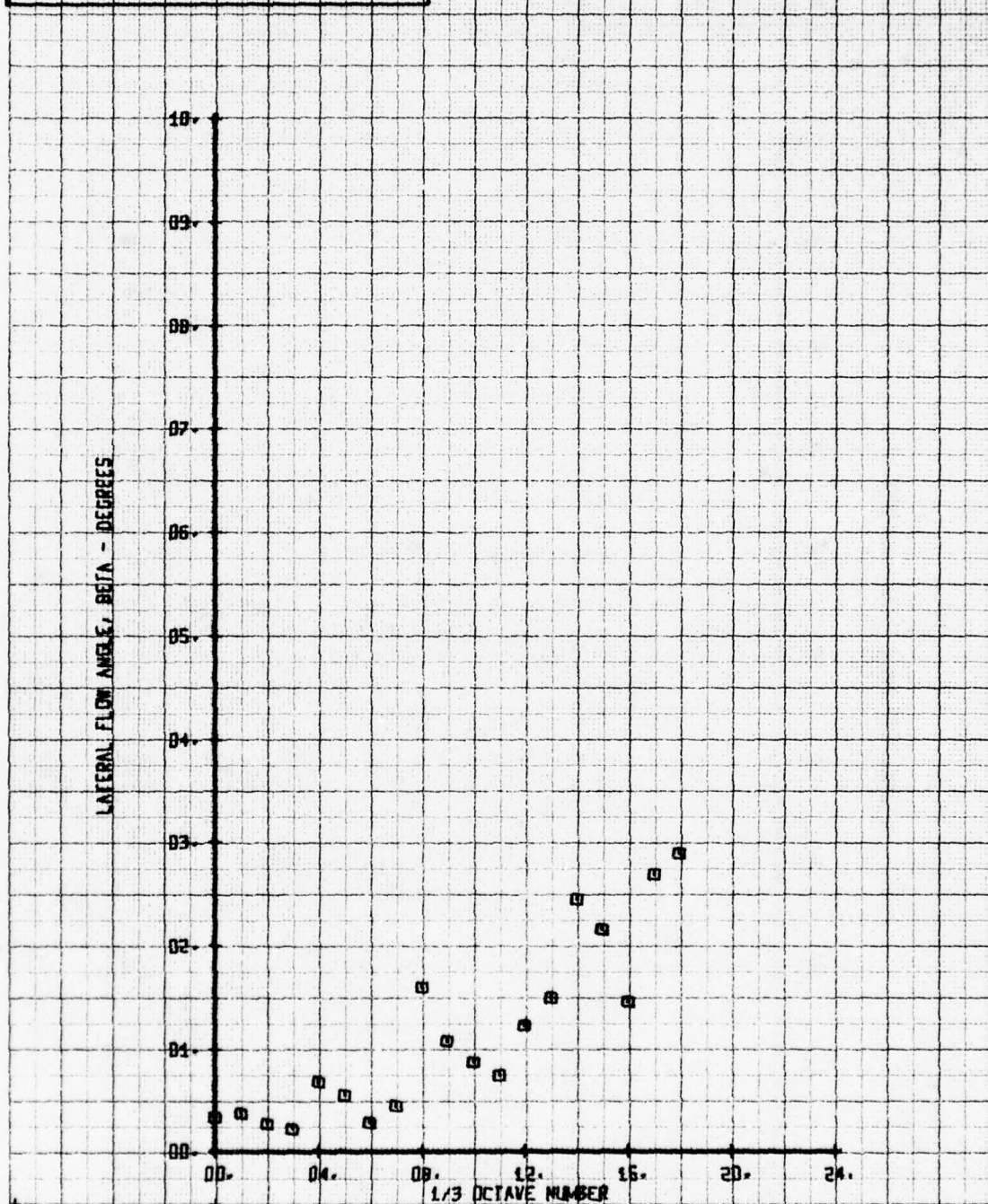
LEGEND
SYM CH PARAMETER
□ 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOY FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTWL. NACELLES
RUN 142 TP 15

LEGEND
SYM CH PARAMETER
□ SS BETA



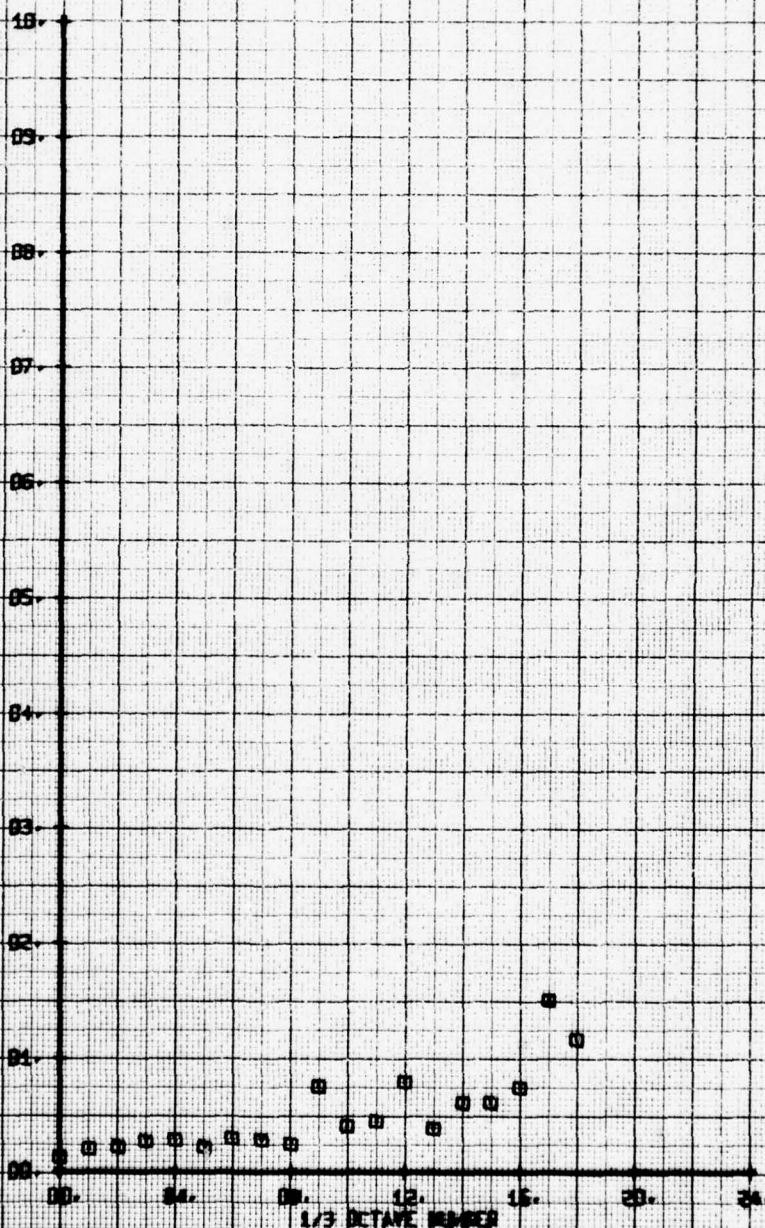
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNN. NACELLIES
 RUN 142 TP. 16

SYM
 0

CH
 65

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



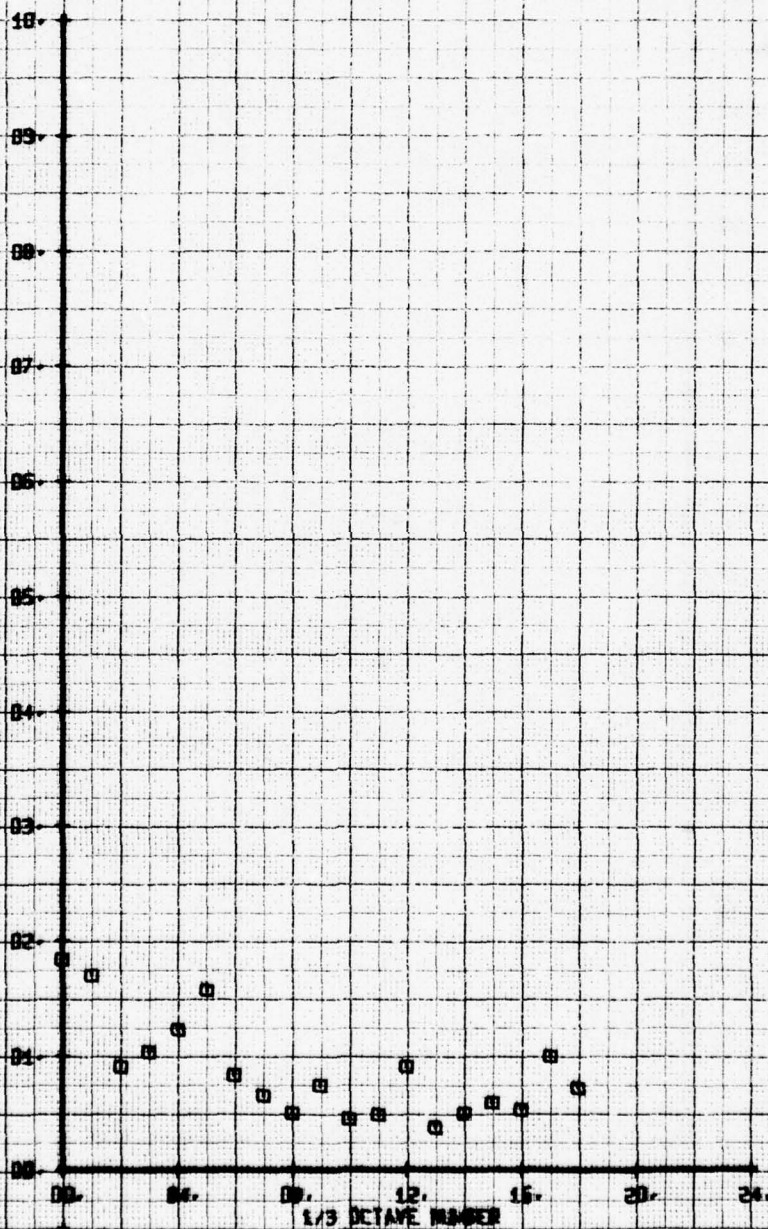
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUDDEVANE BTNN. NACELLES
 RUN 142 TP 17

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

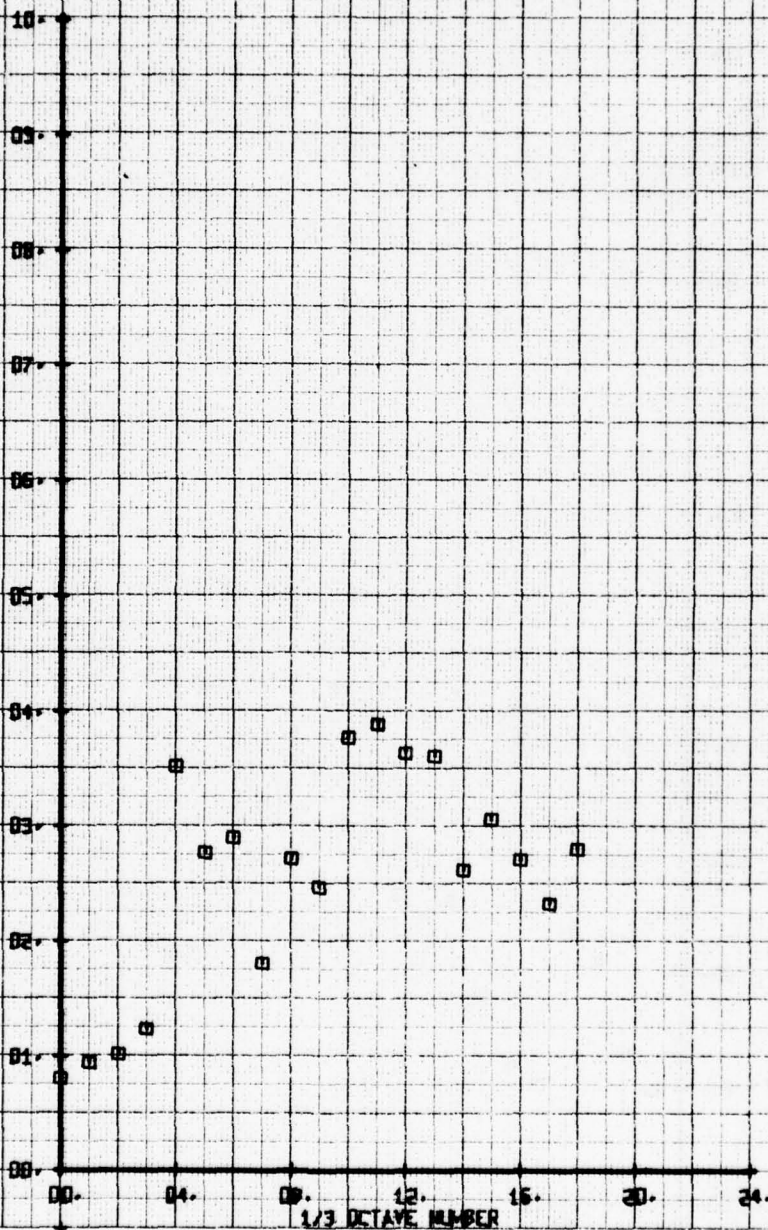
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDECANE BTNN- FACELLES
 RUN 142 TP 7

LEGEND
 SYM CN PARAMETER
 □ 66 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



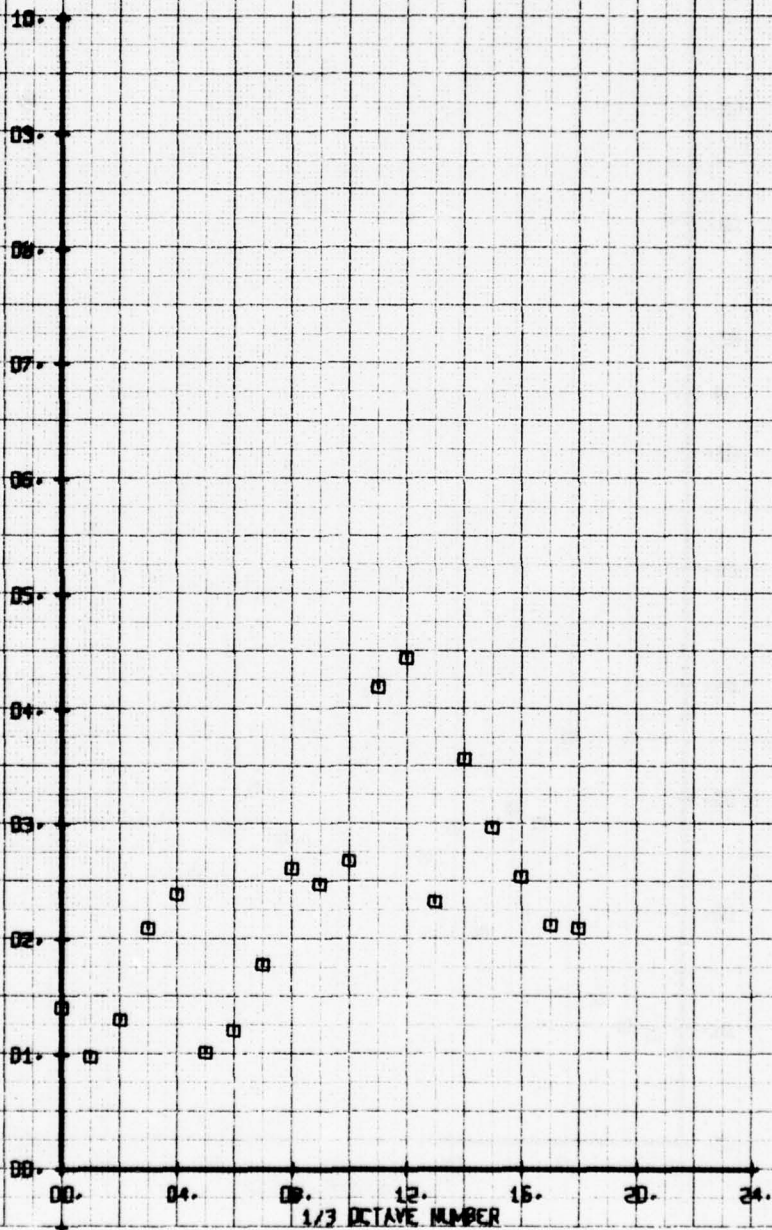
NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNN- NACELLIES
 RUN 142 TP 9

SYM
 □

CN
 66

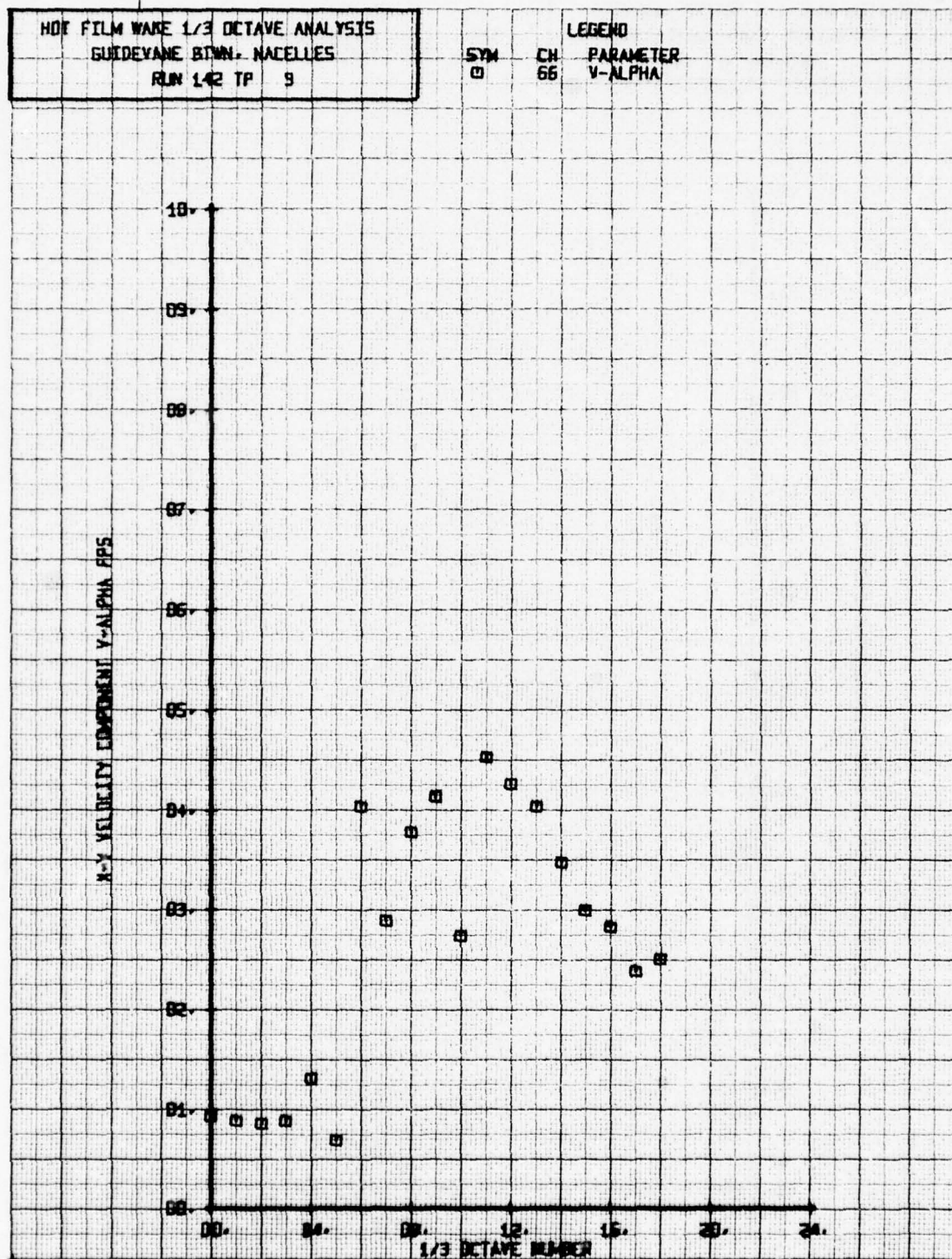
LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTWN. NACELLES
 RUN 142 TP 9

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA



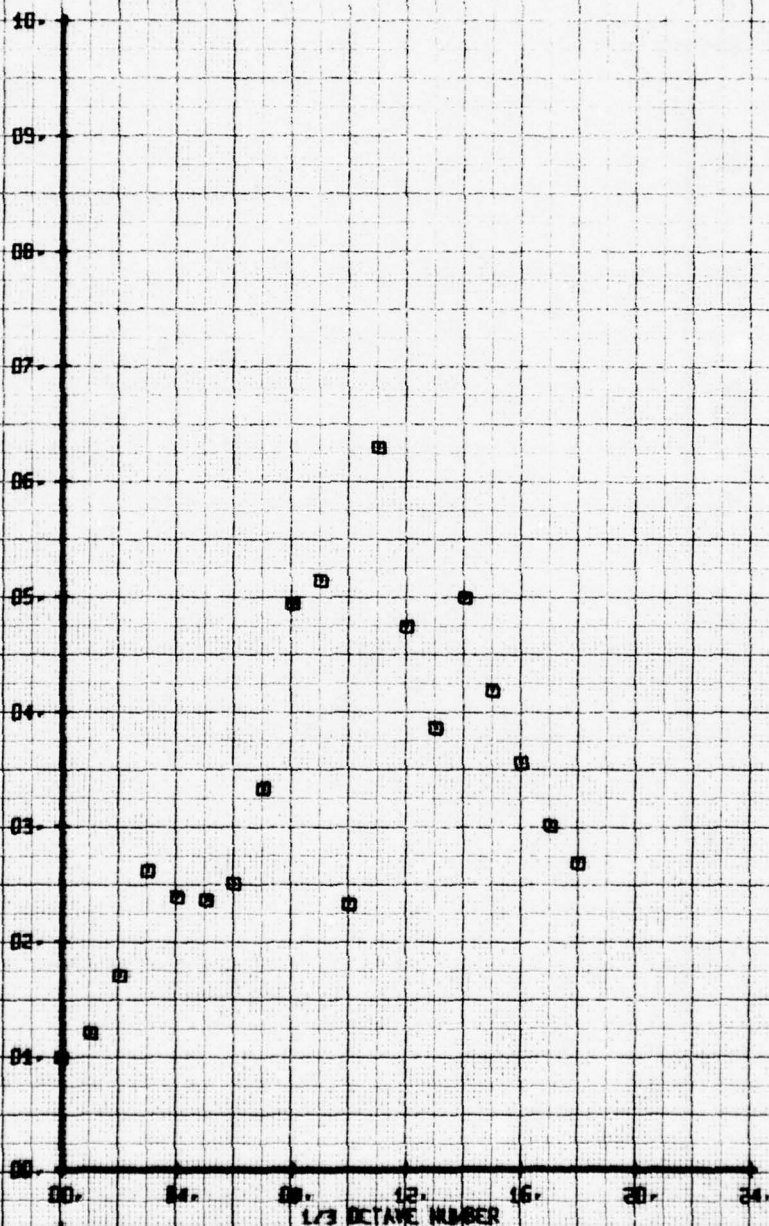
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GLIDEWAYE BURN- NACELLES
 RUN 142 TP 10

SYM
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CH
 66

LEGEND
 PARAMETER
 V-ALPHA

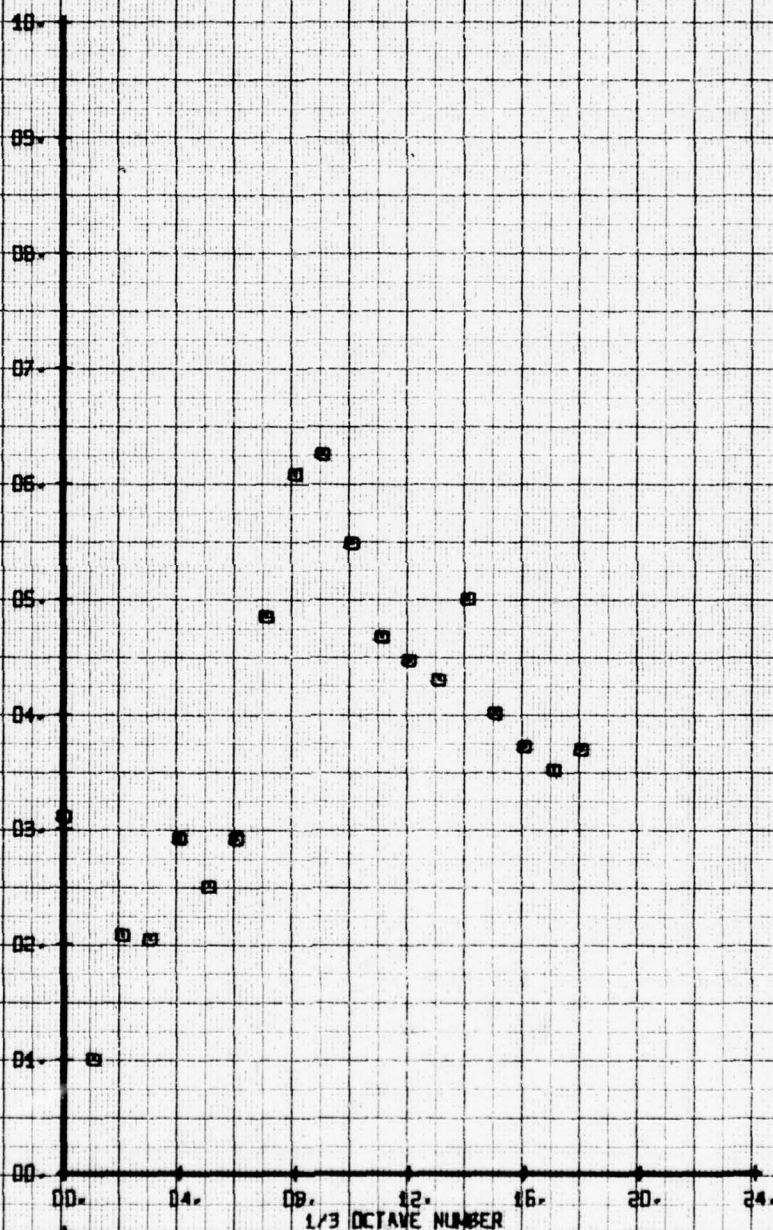
X-Y VELOCITY COMPONENT V-ALPHA EPS



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTWN. NACELLES
RUN 142 TP 11

LEGEND
SYM CH PARAMETER
Q 66 V-ALPHA

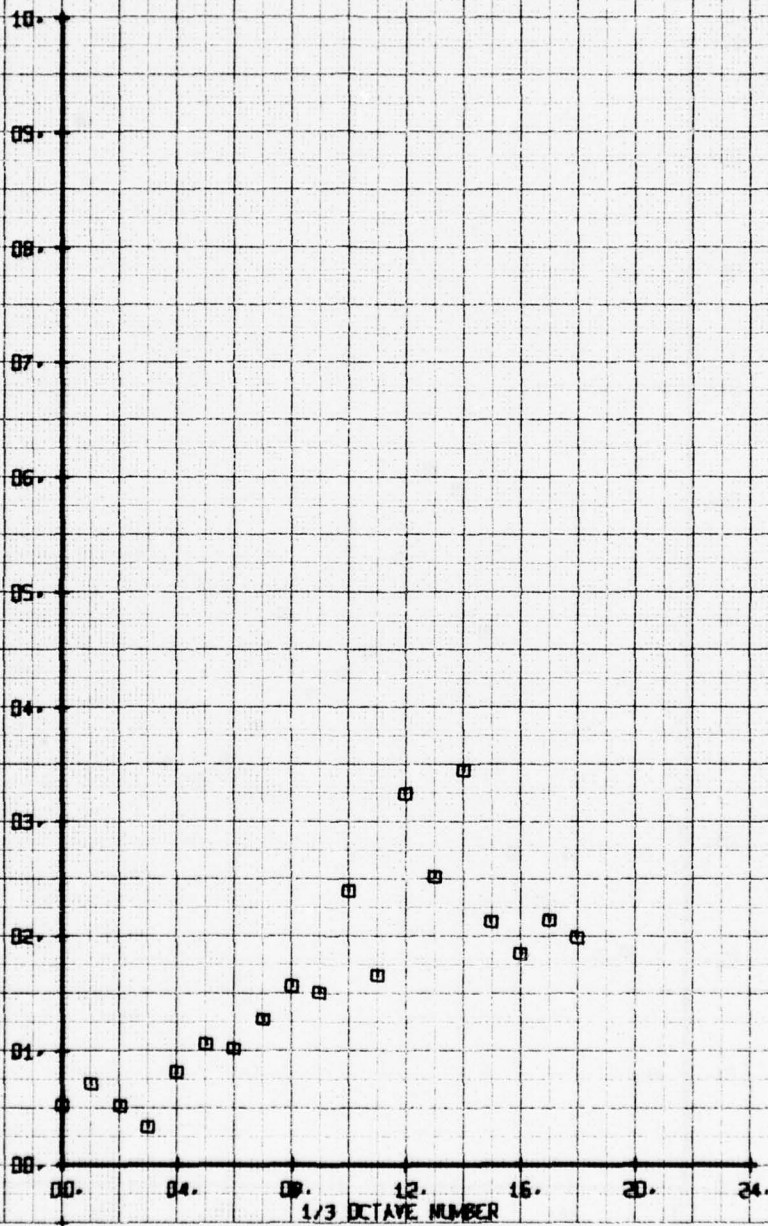
N-Y VELOCITY COMPONENT V-ALPHA EPS



HOT FILM WIRE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTNN- MACELLES
RUN 142 TP 12

SYN CH PARAMETER
□ 66 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



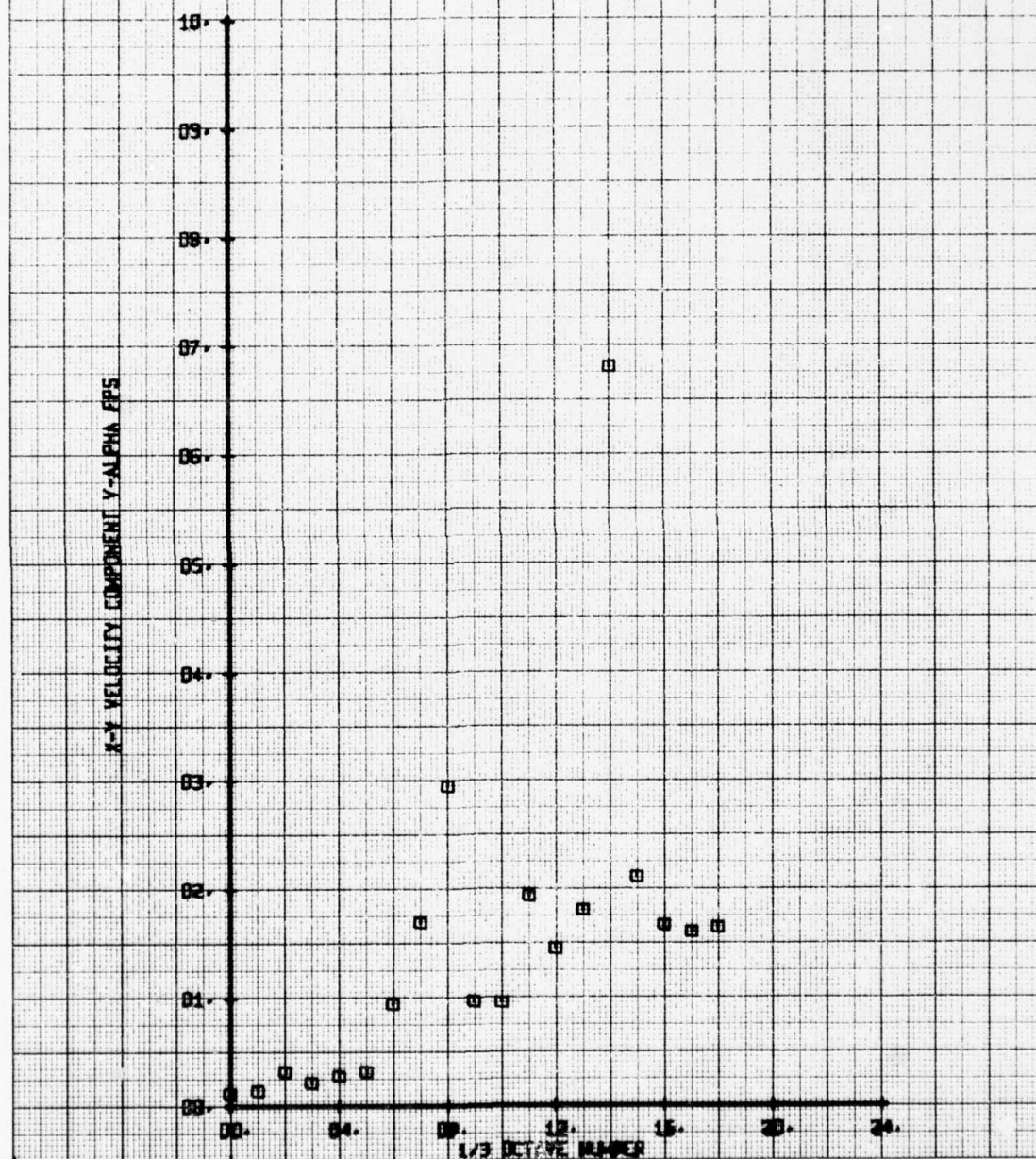
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTWN. NACELLES
 RUN 142 TP 13

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

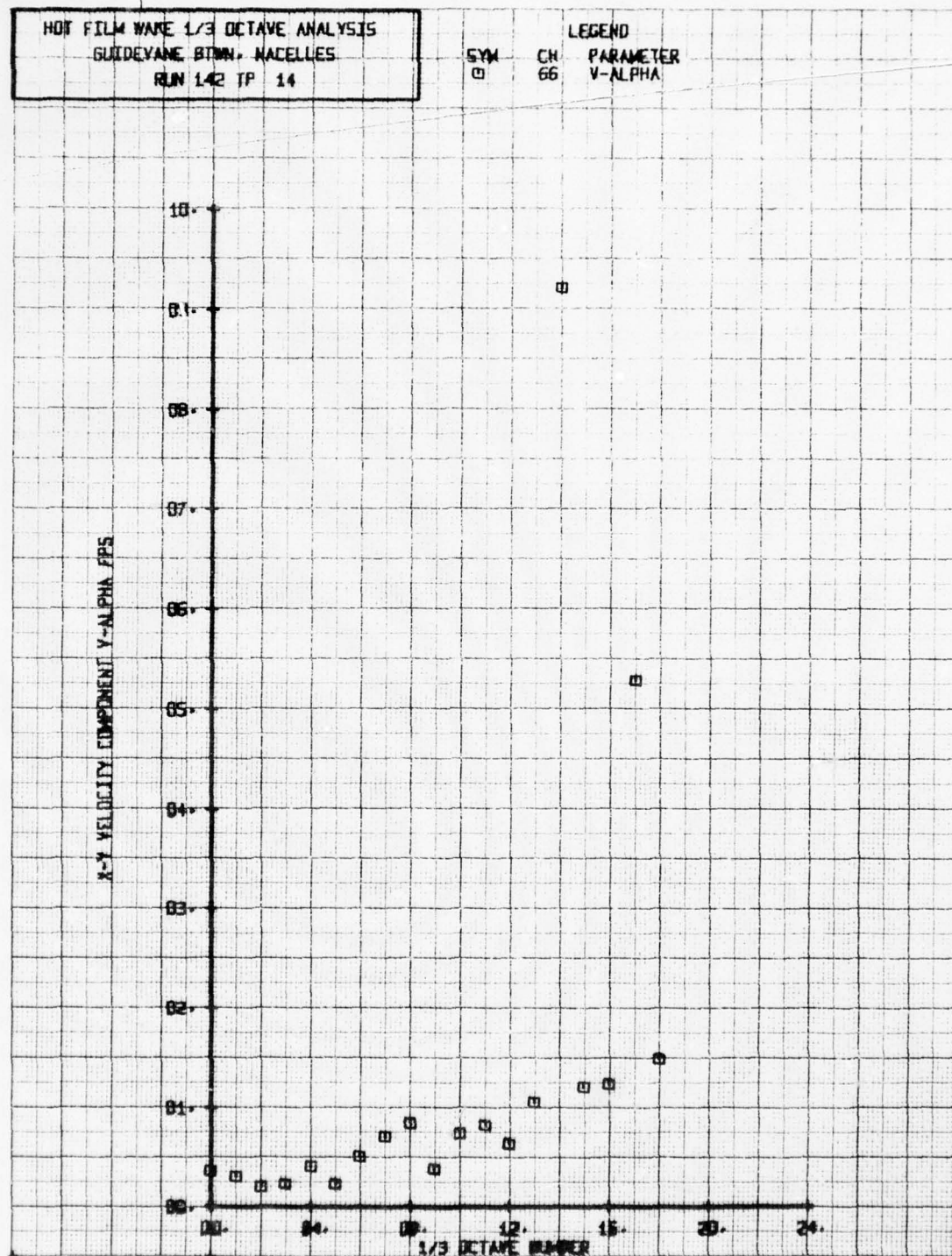
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTNN. NACELLES
RUN 142 TP 14

LEGEND
SYM CH PARAMETER
□ 66 V-ALPHA

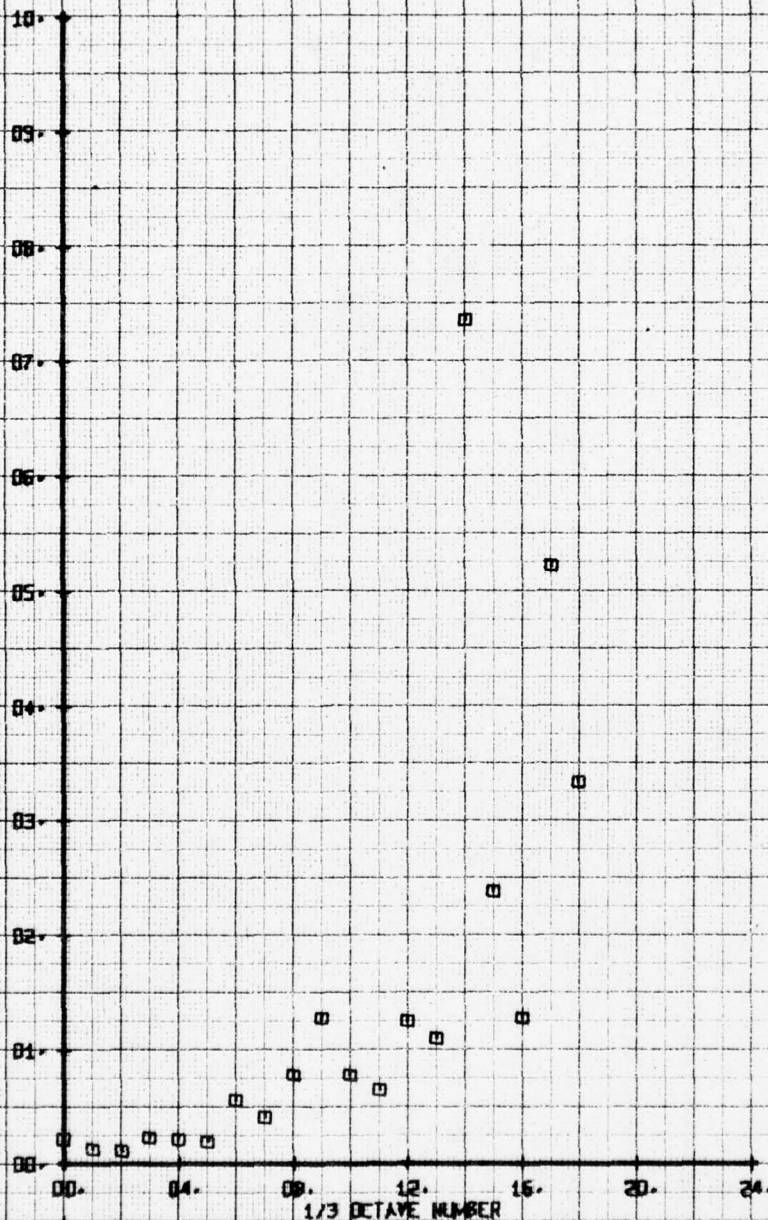
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDOVANE BTHN. NACELLES
 RUN 142 TP 15

LEGEND
 CH 66
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



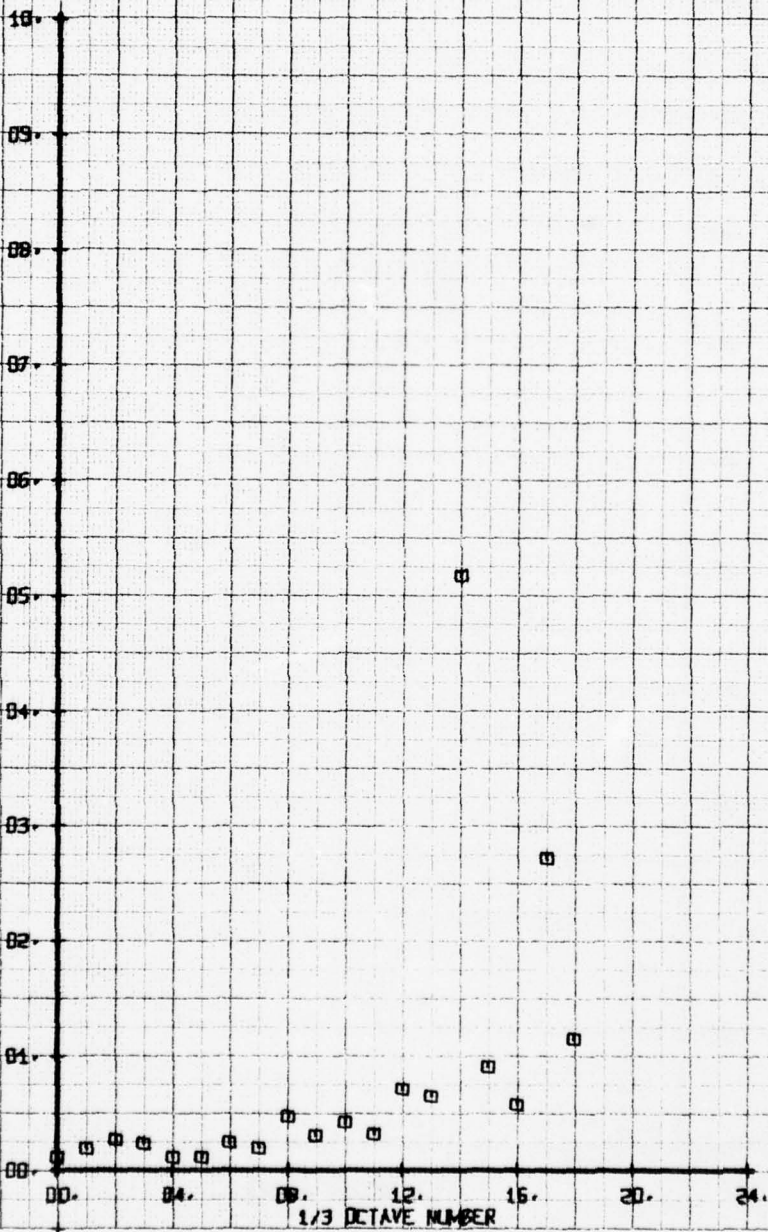
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE 8THN. NACELLUS
 RUN 142 TP 16

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS

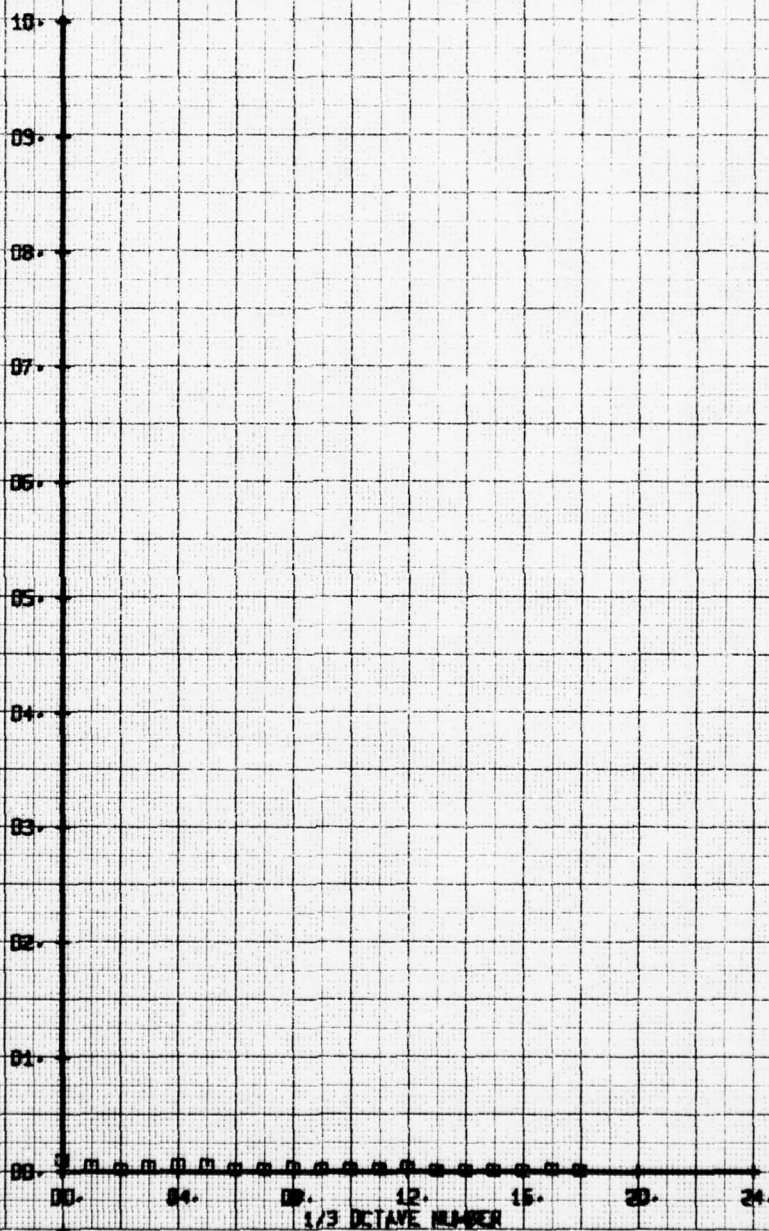


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTM - NACELLES
RUN 142 TP 17

SYM
□

LEGEND
CH 66
PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



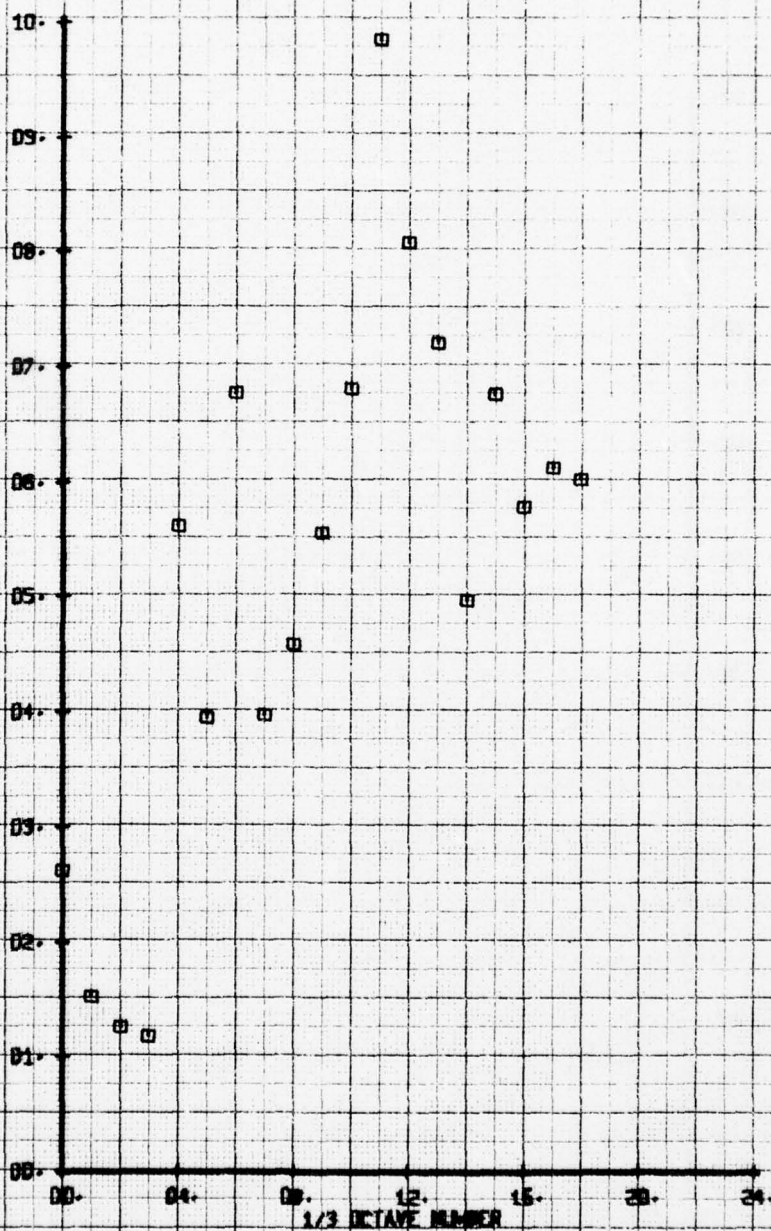
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTWN- NACELLES
RUN 142 TP 7

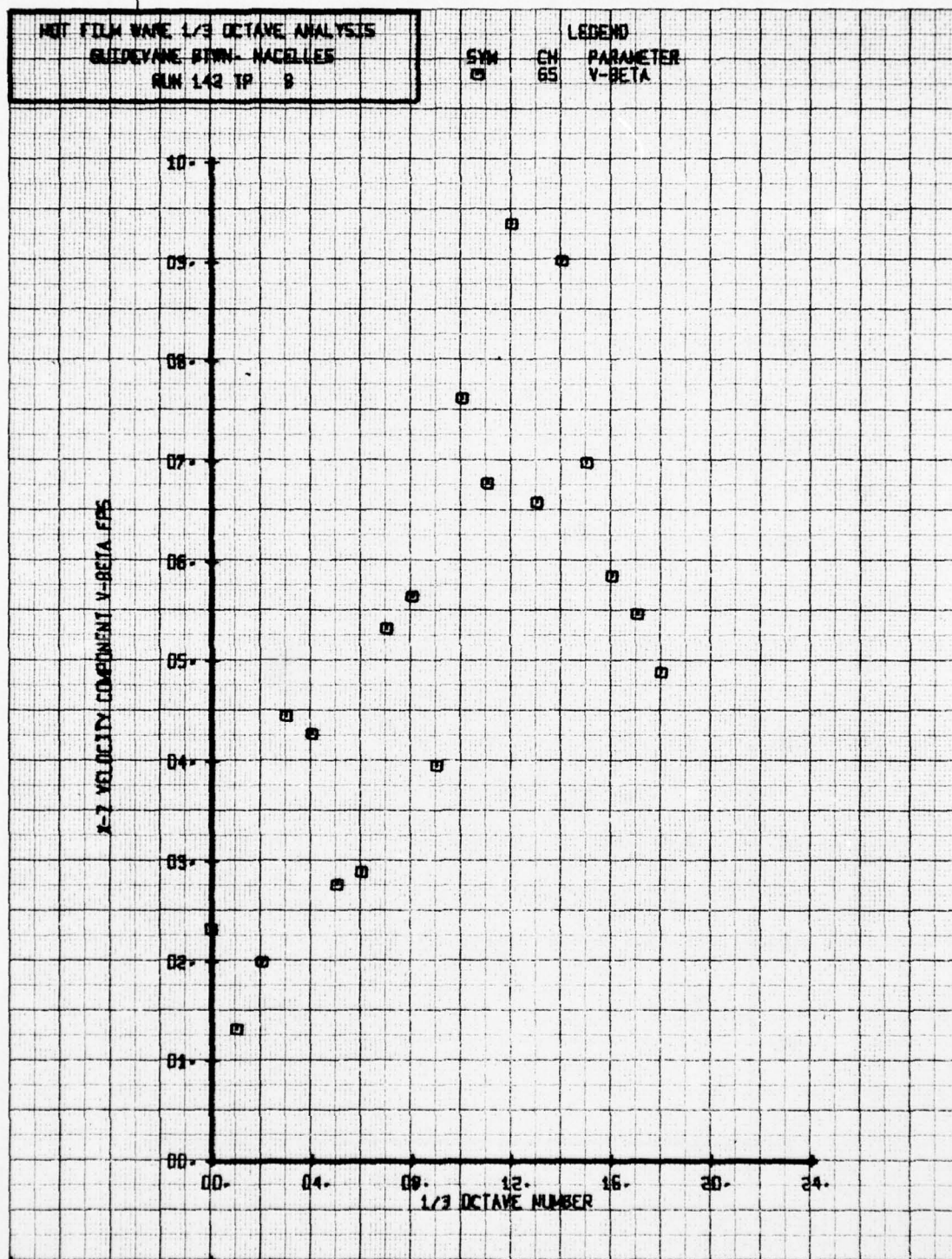
SYM
□

CM
65

LEGEND
PARAMETER
V-BETA

X-1 VELOCITY COMPONENT V-BETA FPS

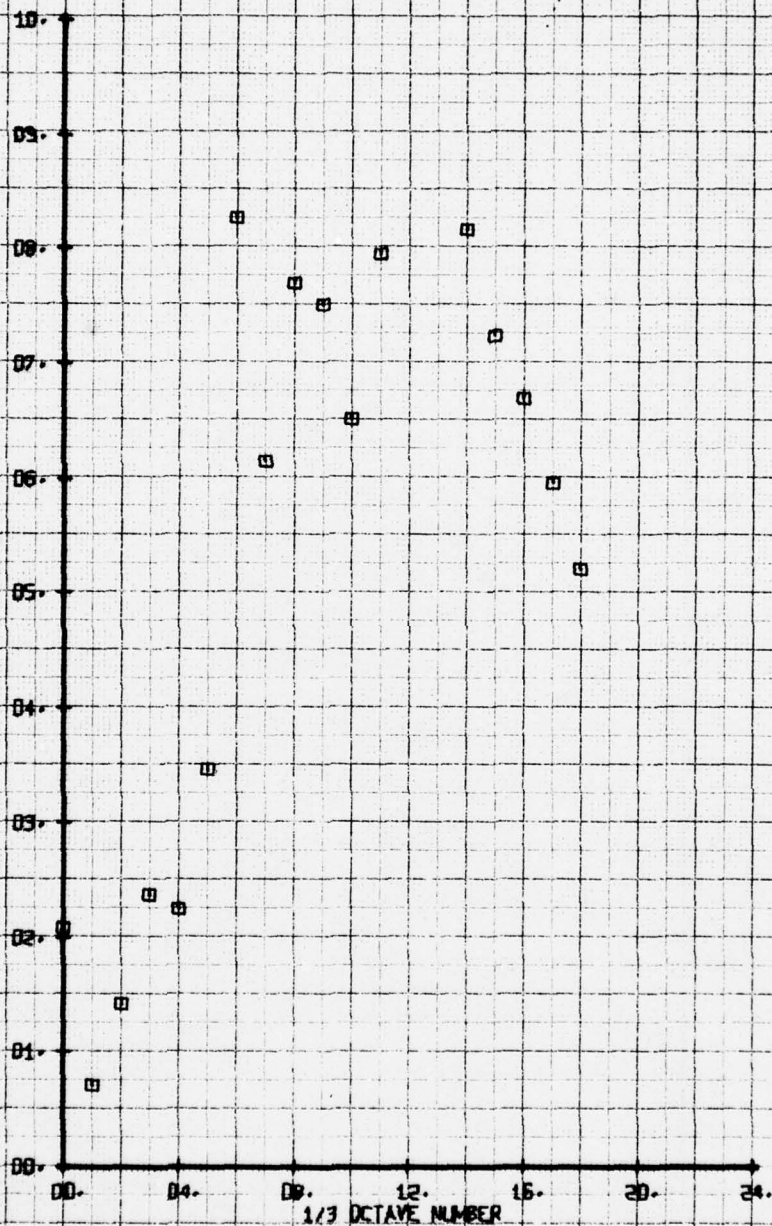




NOI FILM WAVE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTM - MACELLES
 RUN 142 TP 9

SYN CH PARAMETER
 0 65 V-BETA

X-7 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNN. MACELLIES
 RUN 142 TP 10

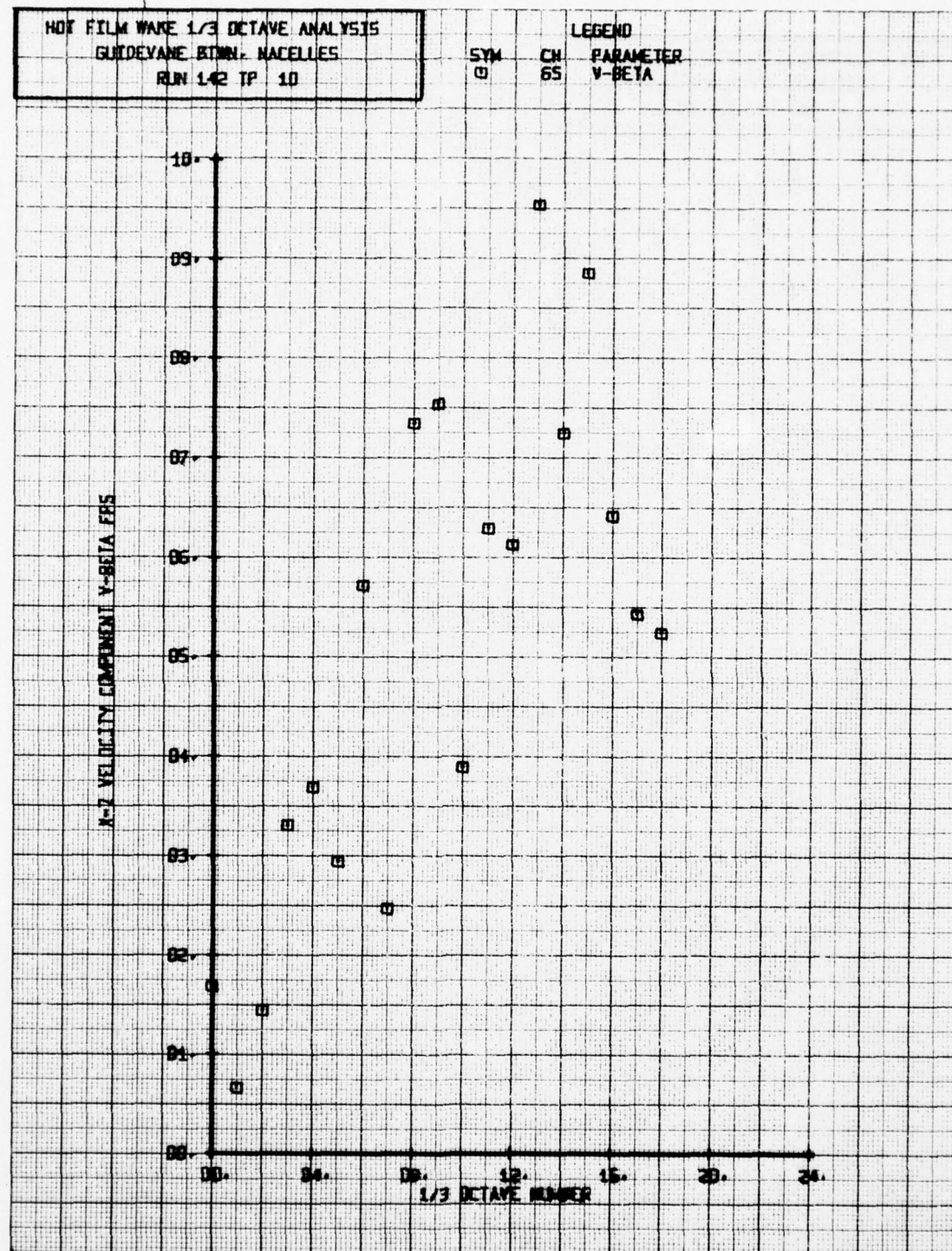
SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FFS

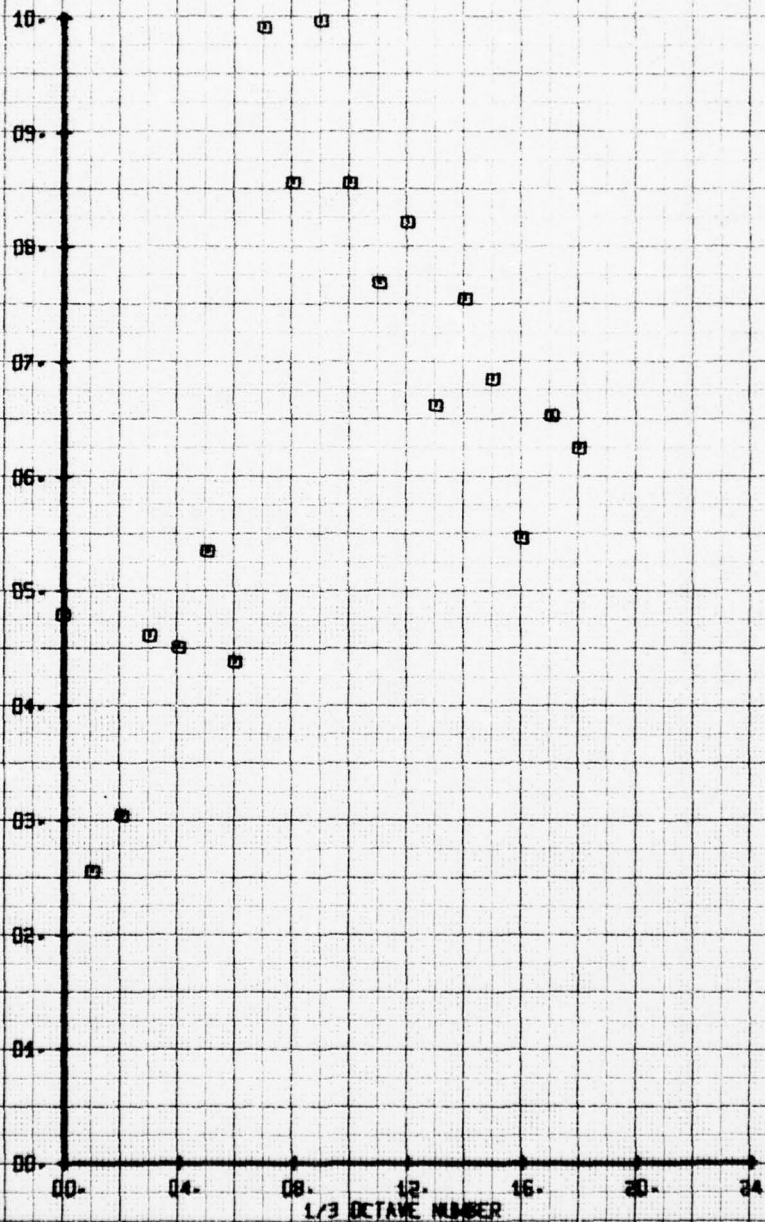
1/3 OCTAVE NUMBER

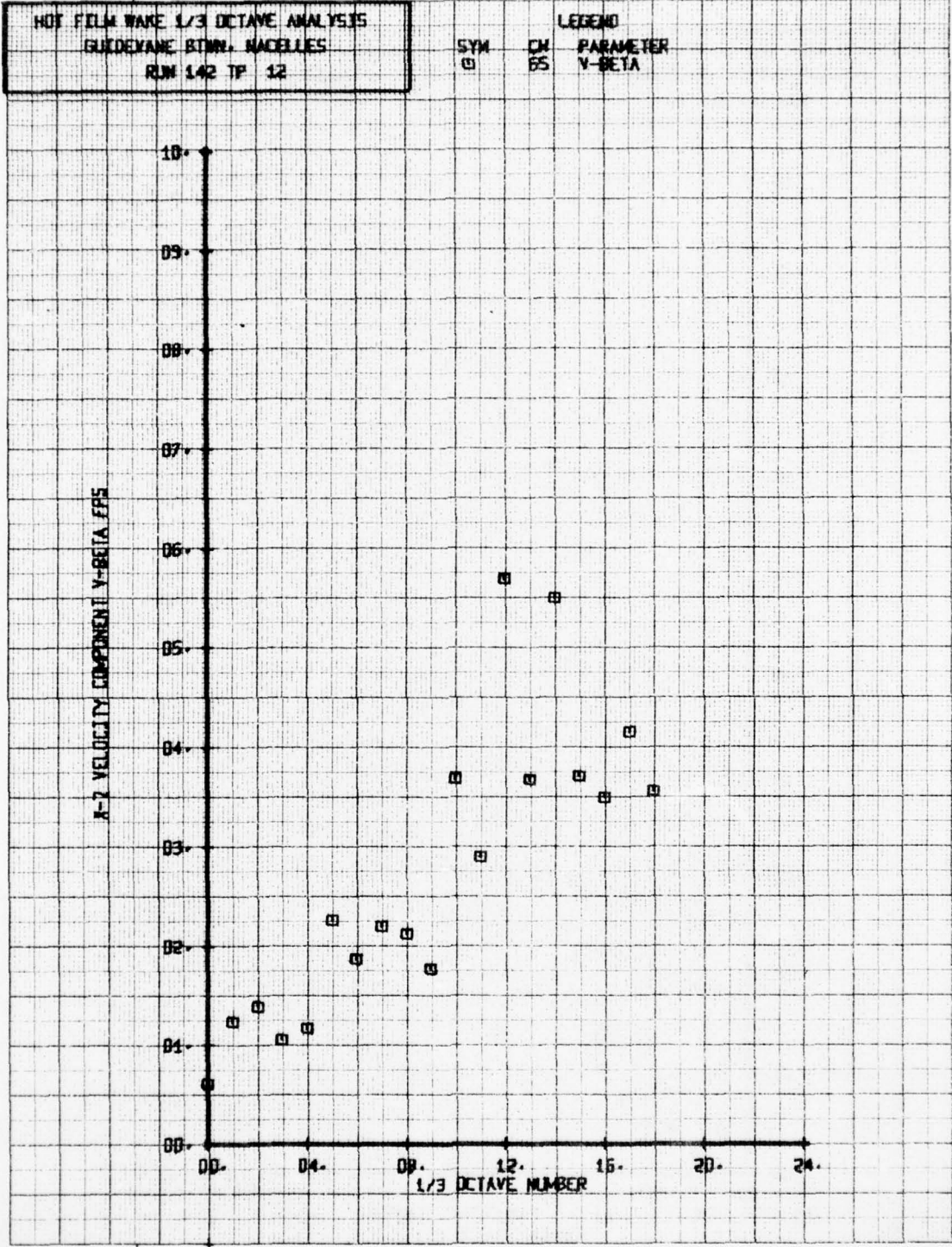


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTWN. NACELLES
RUN 142 TP 11

LEGEND
SYM CH PARAMETER
□ 65 V-BETA

X-2 VELOCITY COMPONENT Y-BETA FPS





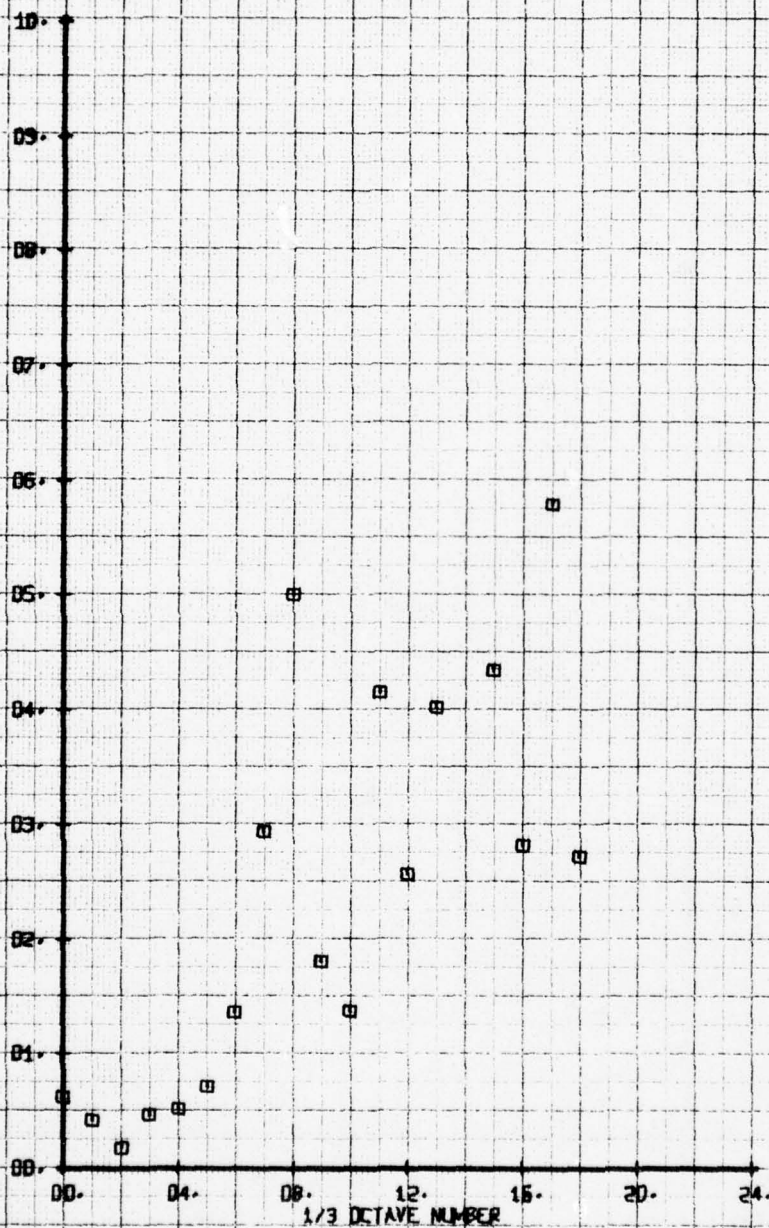
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 GUIDEVANE BTNN. NACELLES
 RUN 142 TP 13

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



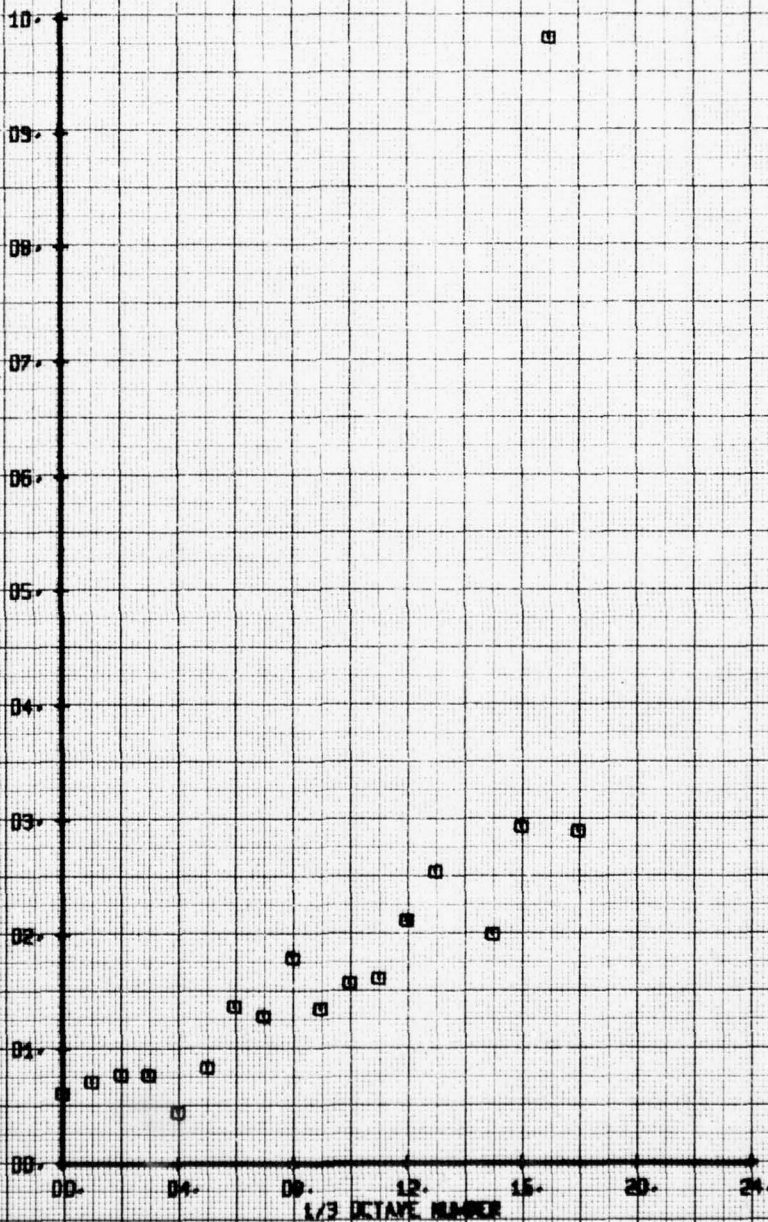
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTM. NACELLES
RUN 142 TP 14

SYM
□

CH
65

LEGEND
PARAMETER
V-BETA

A-2 VELOCITY COMPONENT V-BETA FPS



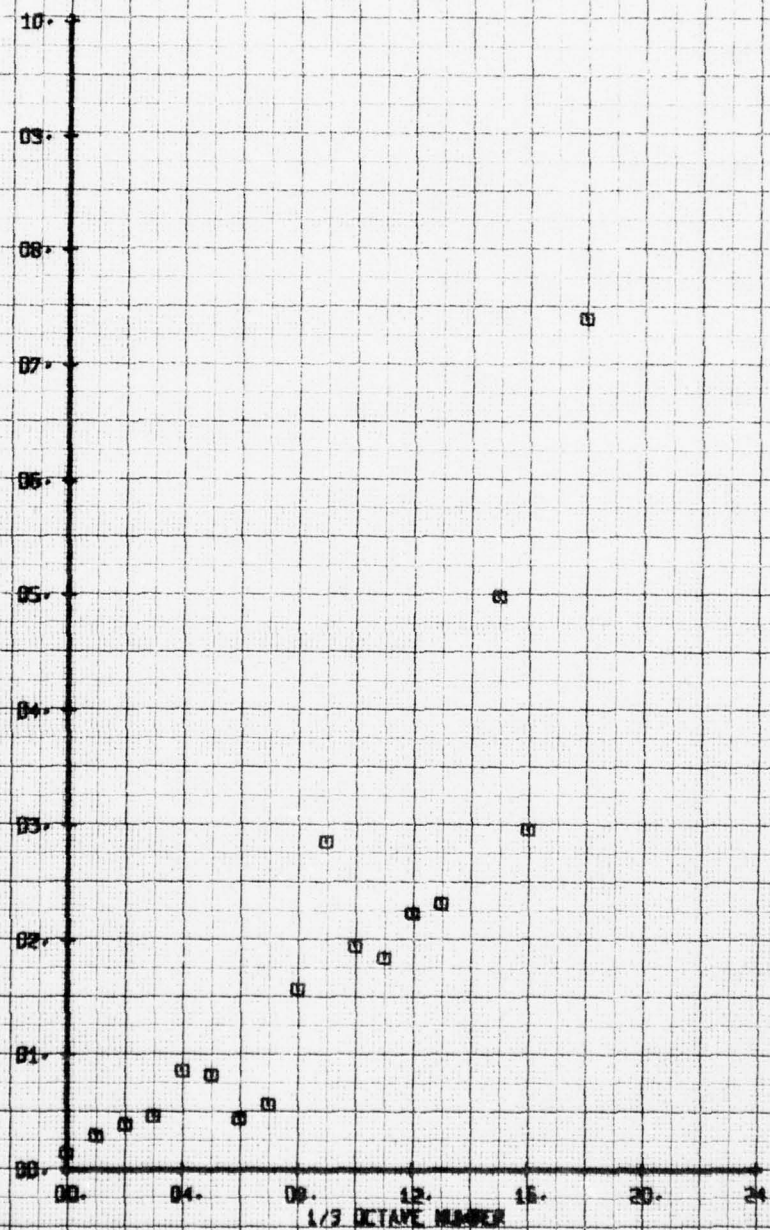
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
GUIDEVANE BTWN. NACELLES
RUN 142 TP 15

SYM
□

EN
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LEGEND
PARAMETER
V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



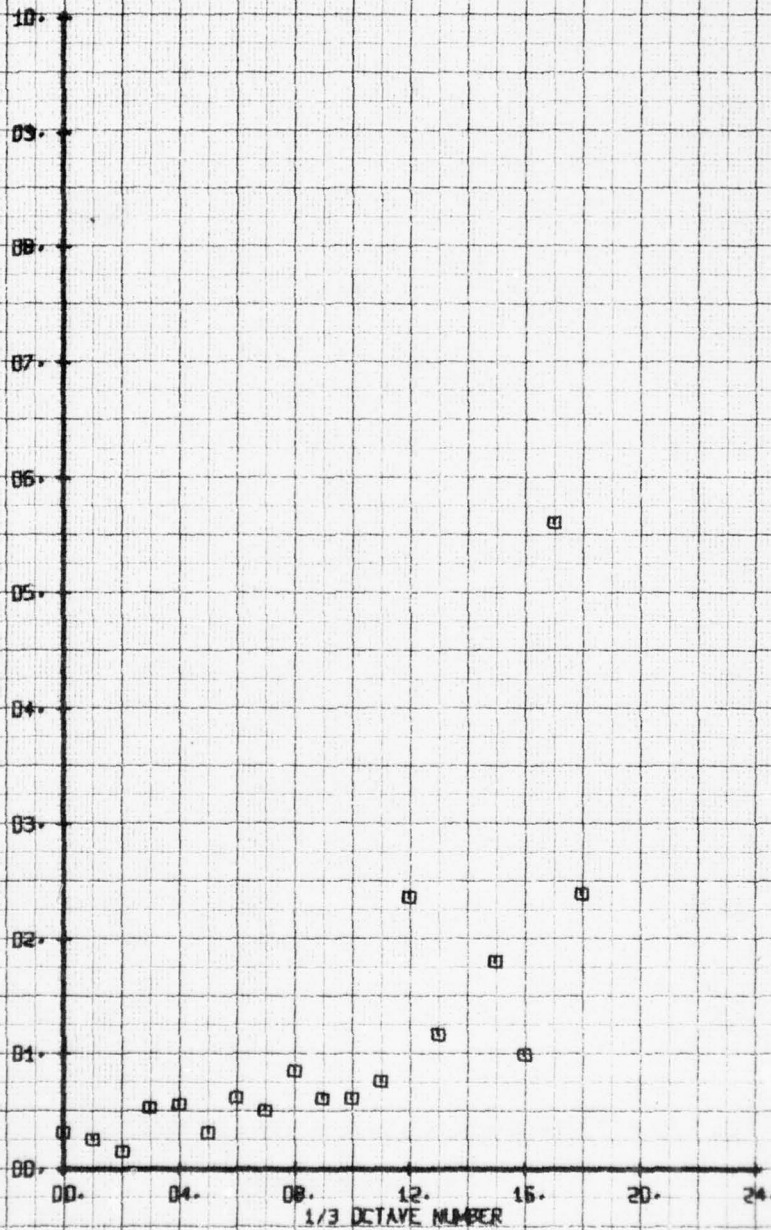
NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 GULDEVANE BTM. NACELLES
 RUN 142 TP 16

SYM
 □

CM
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)
SEP 78 P F SHERIDAN

F/G 1/3

DAAJ02-77-C-0020

UNCLASSIFIED

USARTL-TR-78-23D

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4 OF 4

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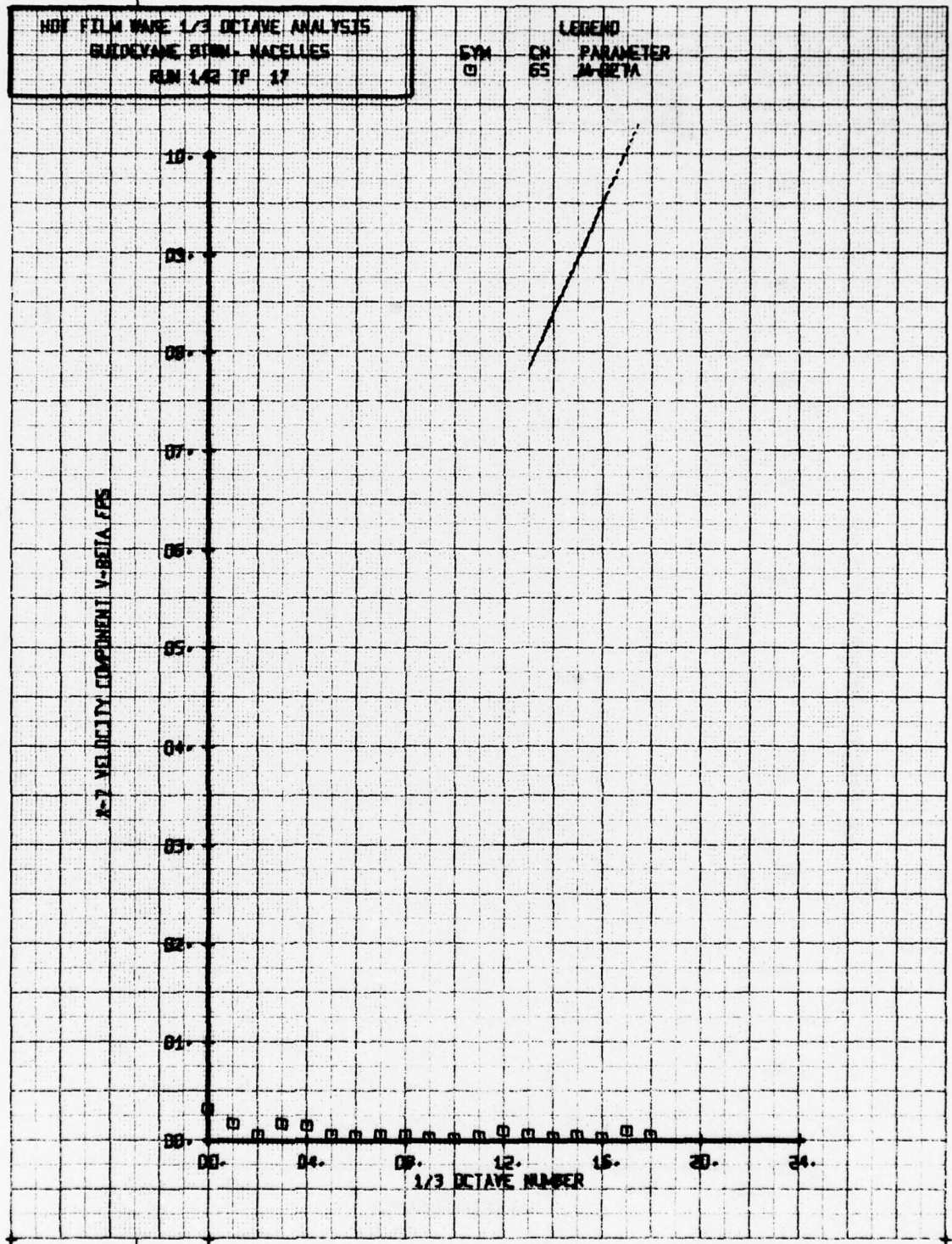
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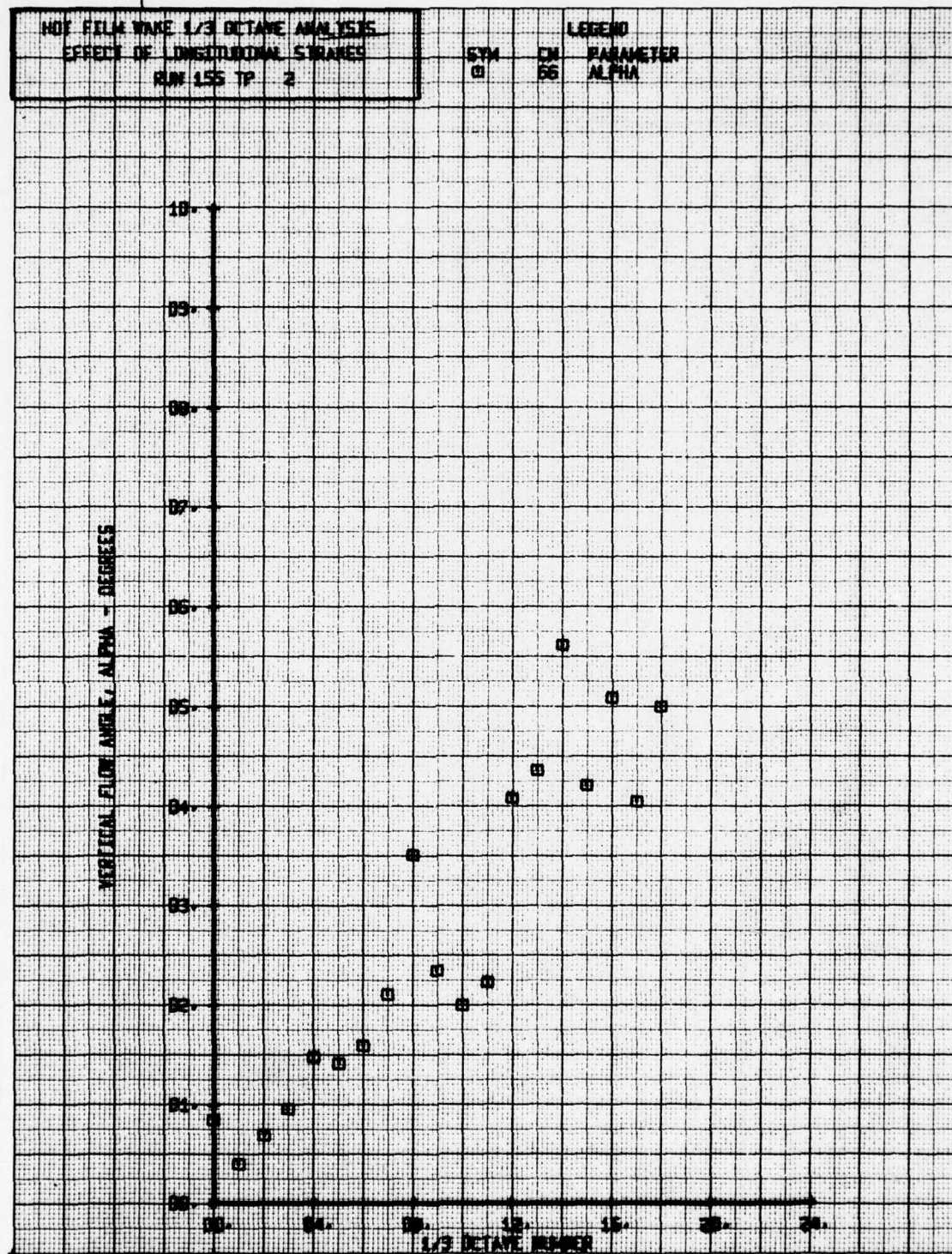
NOY FILM WARE 1/3 OCTAVE ANALYSIS
 GUIDOVANE BTNNL MACELLES
 RUN 142 TP 17

LEGEND	
SYM	PARAMETER
□	65 24-BETA



NOF FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 2

LEGEND
SYM CM PARAMETER
□ 56 ALPHA



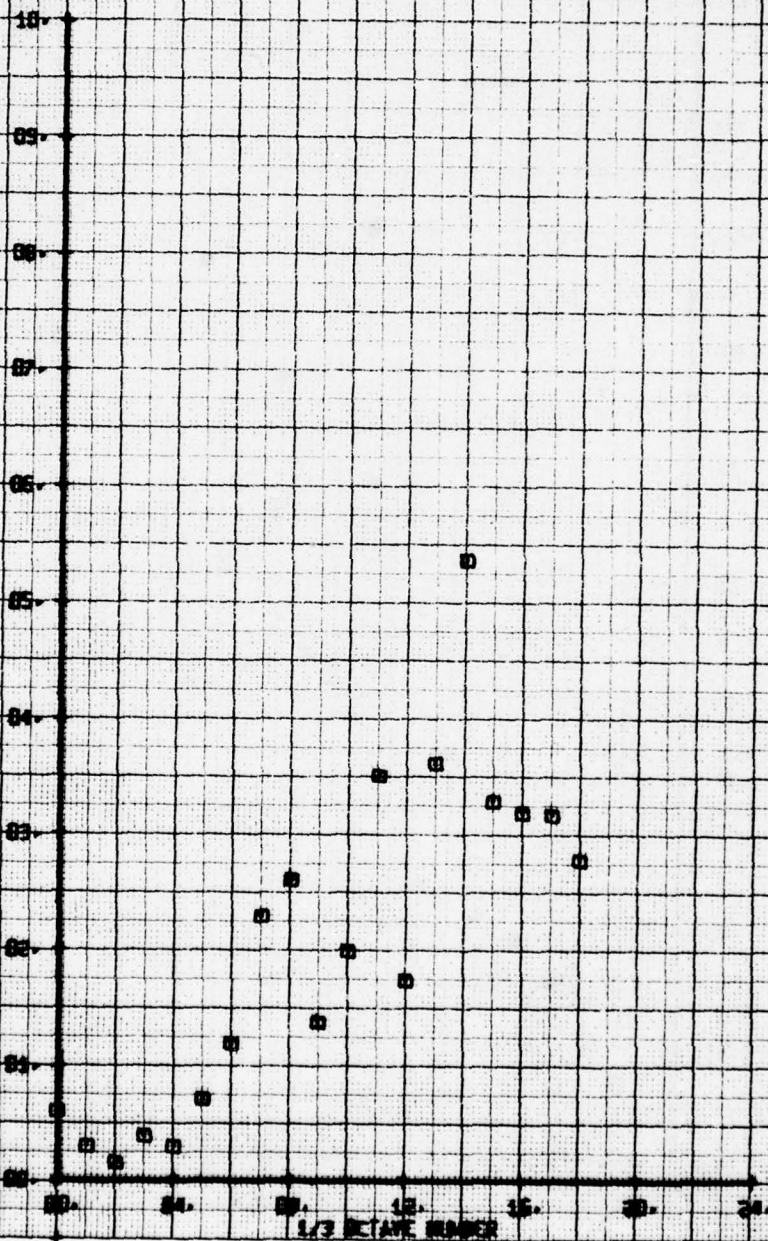
NOI FILM WAVE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAIN
RUN 155 TP 3

SYM
□

CN
66

LEGEND
PARAMETER
ALPHA

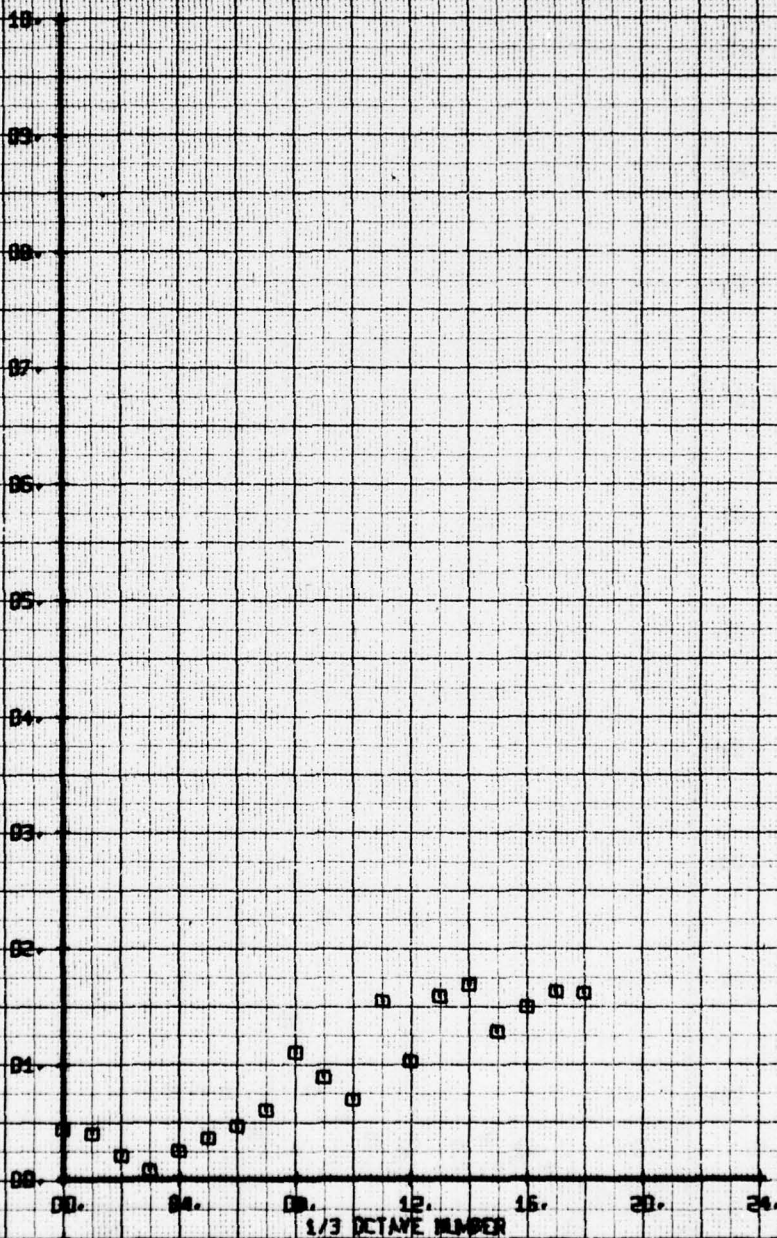
VERTICAL FLOW ANGLE, ALPHA - DEGREES

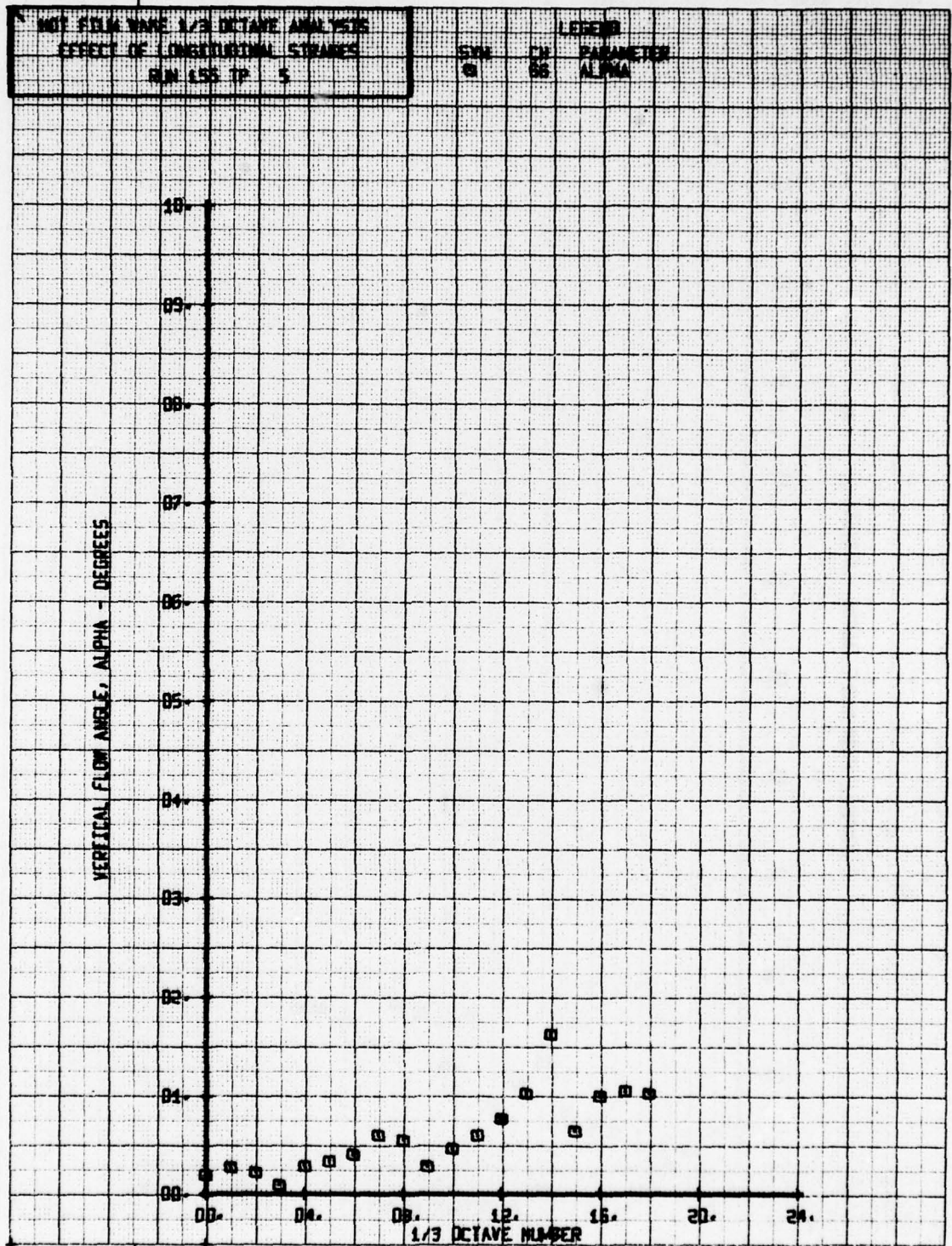


NOY FILM BASE 1/3 OCTAVE ANALYSIS
EFFECT OF DISCONTINUITIES
RM 155 17 1

LEGEND
SYN 0
FM 00
PARAMETER
ALPHA

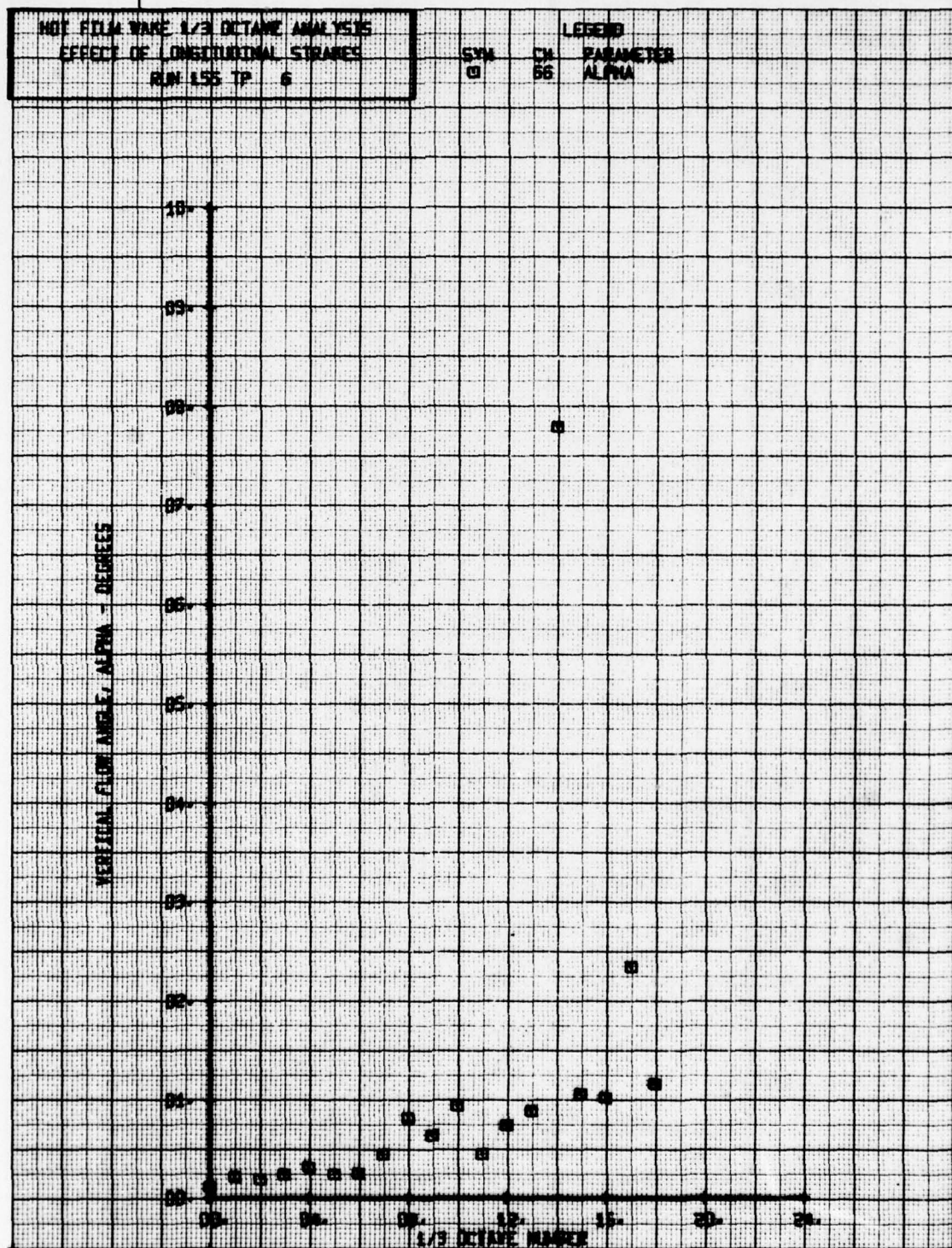
VERTICAL FLOW ANGLE, ALPHA - DEGREES





NOT FILM WARE 1/3 OCTAVE ANALYSIS
EFFECT OF INSTITUTIONAL STRAITS
RUN 155 TP 6

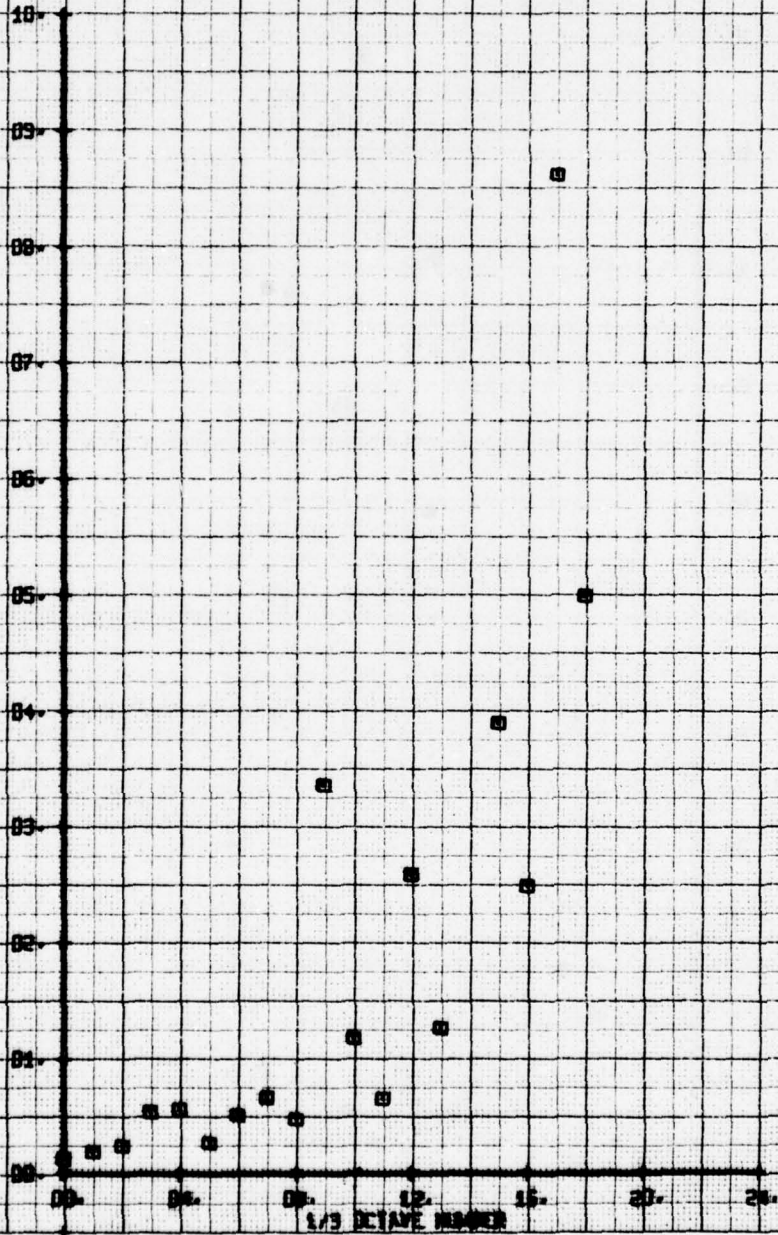
LEGEND
SYM CH PARAMETER
□ 56 ALPHA



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAINES
RUN 155 TP 7

LEGEND
SYM CM PARAMETER
□ 55 ALPHA

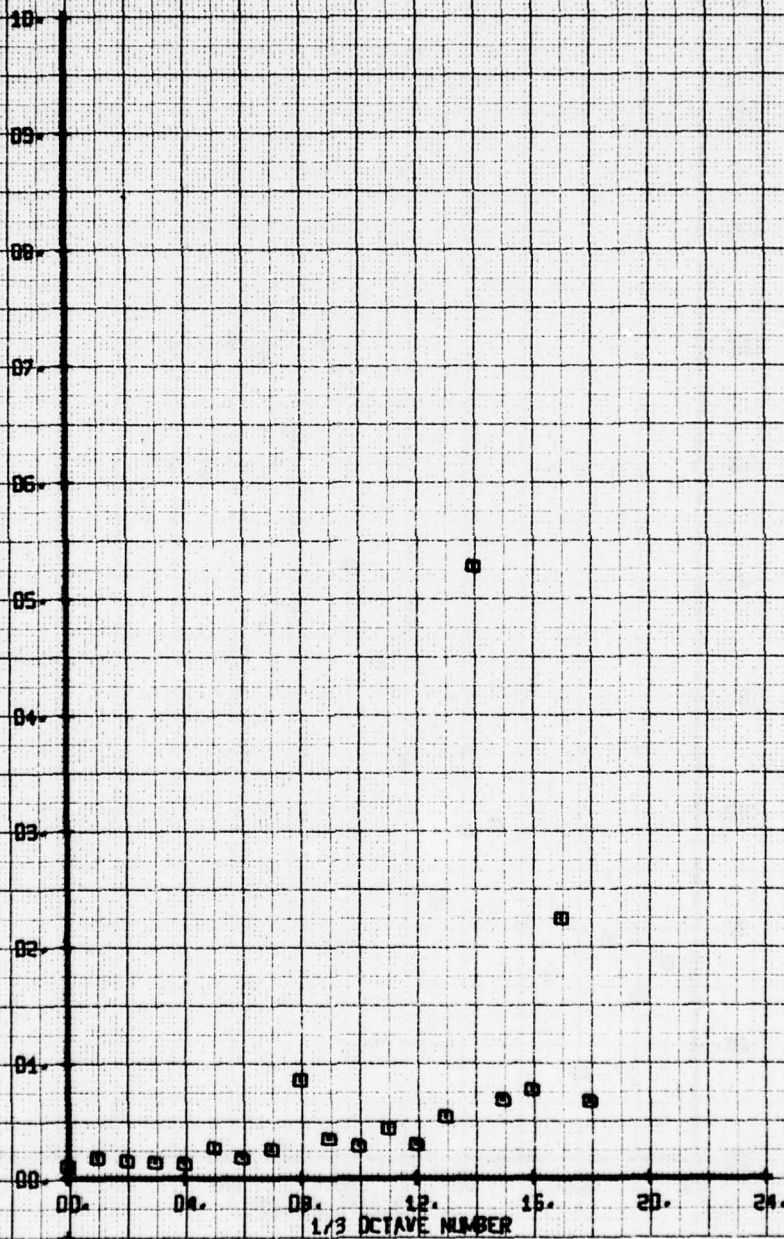
VERTICAL FLOW ANGLE, ALPHA - DEGREES

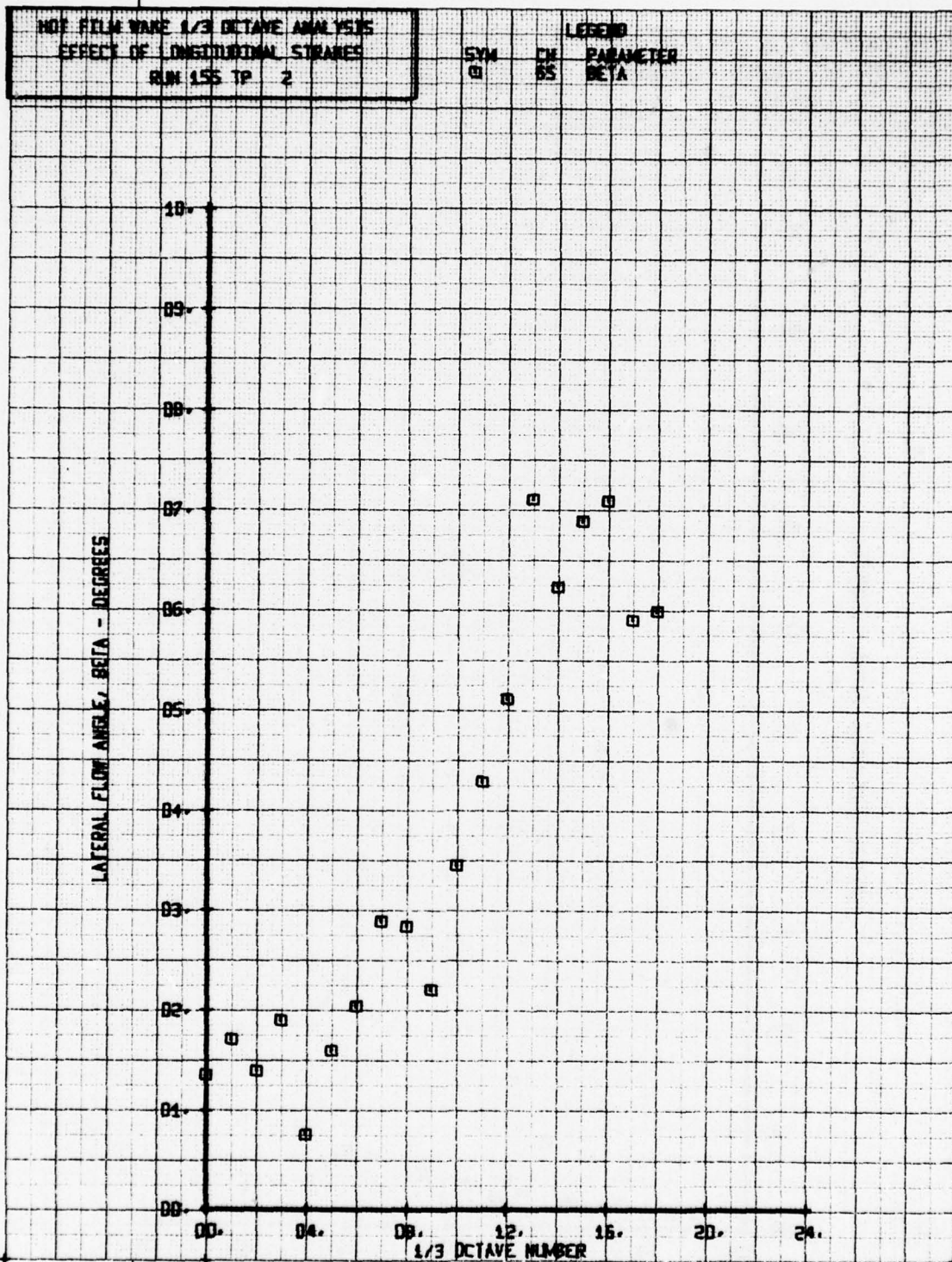


NET FILM YARE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAINS
RUN 155 TP 8

LEGEND
SYN CH PARAMETER
03 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES





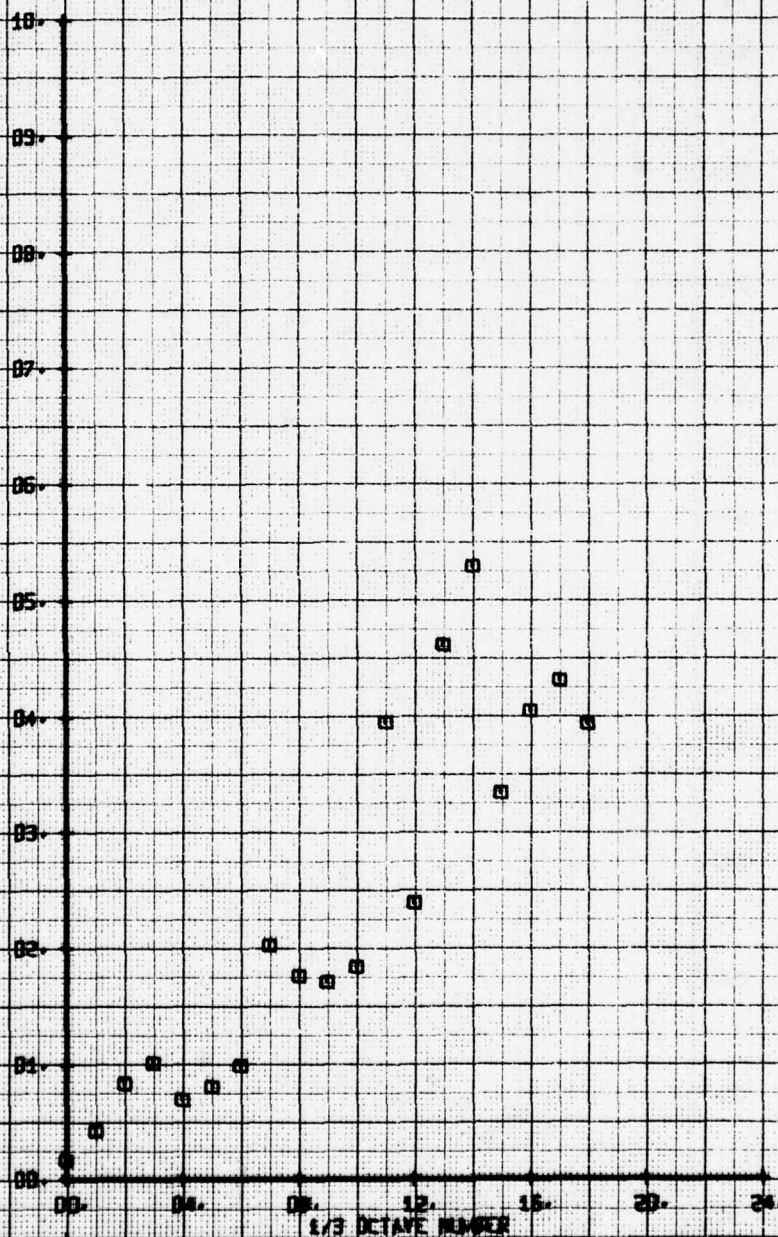
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EFFECT OF LONGITUDINAL STRAIN
 RUN 155 TP 3

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



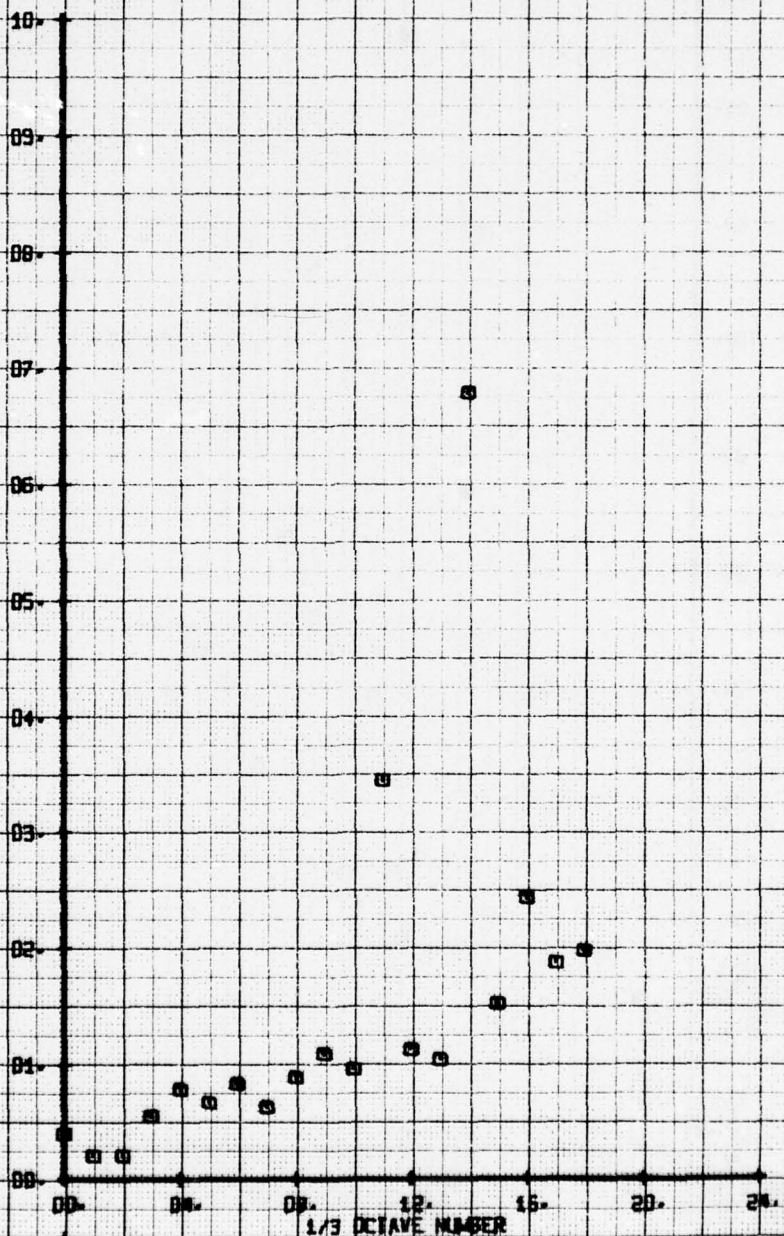
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 4

SYM
□

CH
65

LEGEND
PARAMETER
BETA

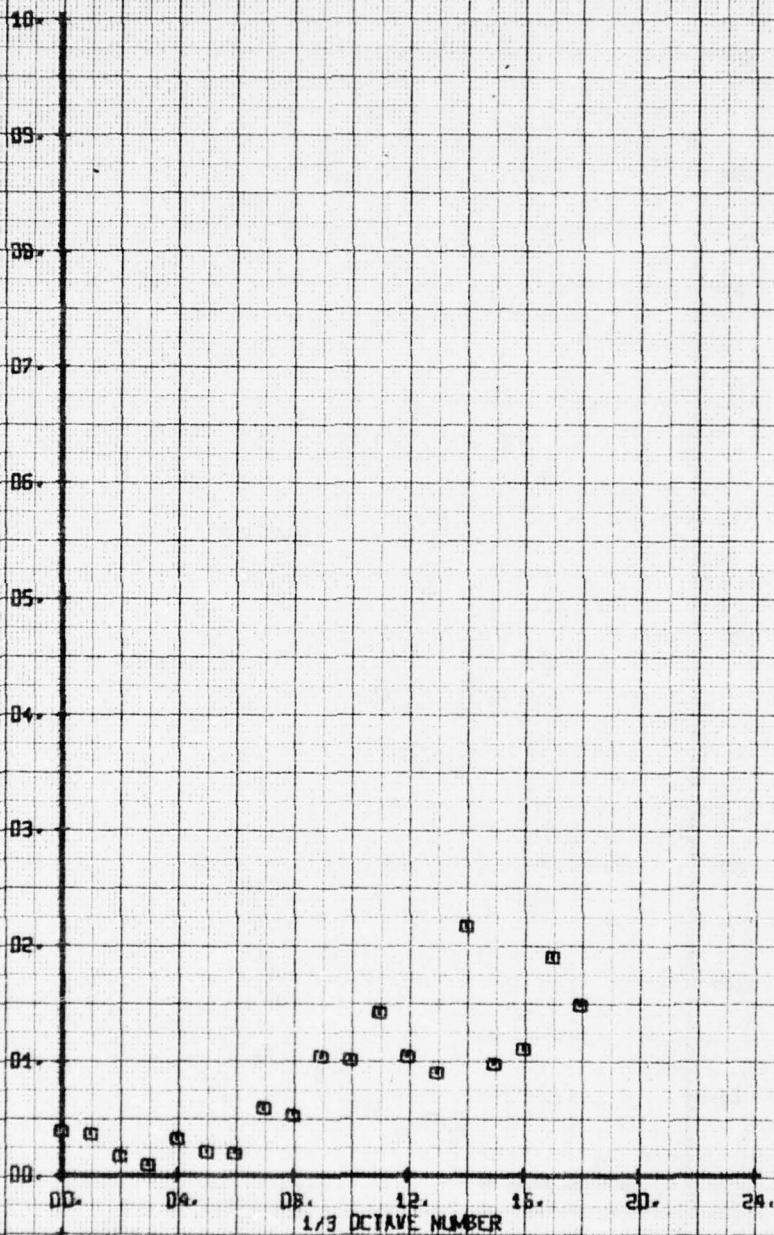
LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAIN
RUN 155 TP 5

SYM	CH	LEGEND
□	65	PARAMETER BETA

LATERAL FLOW ANGLE, BETA - DEGREES



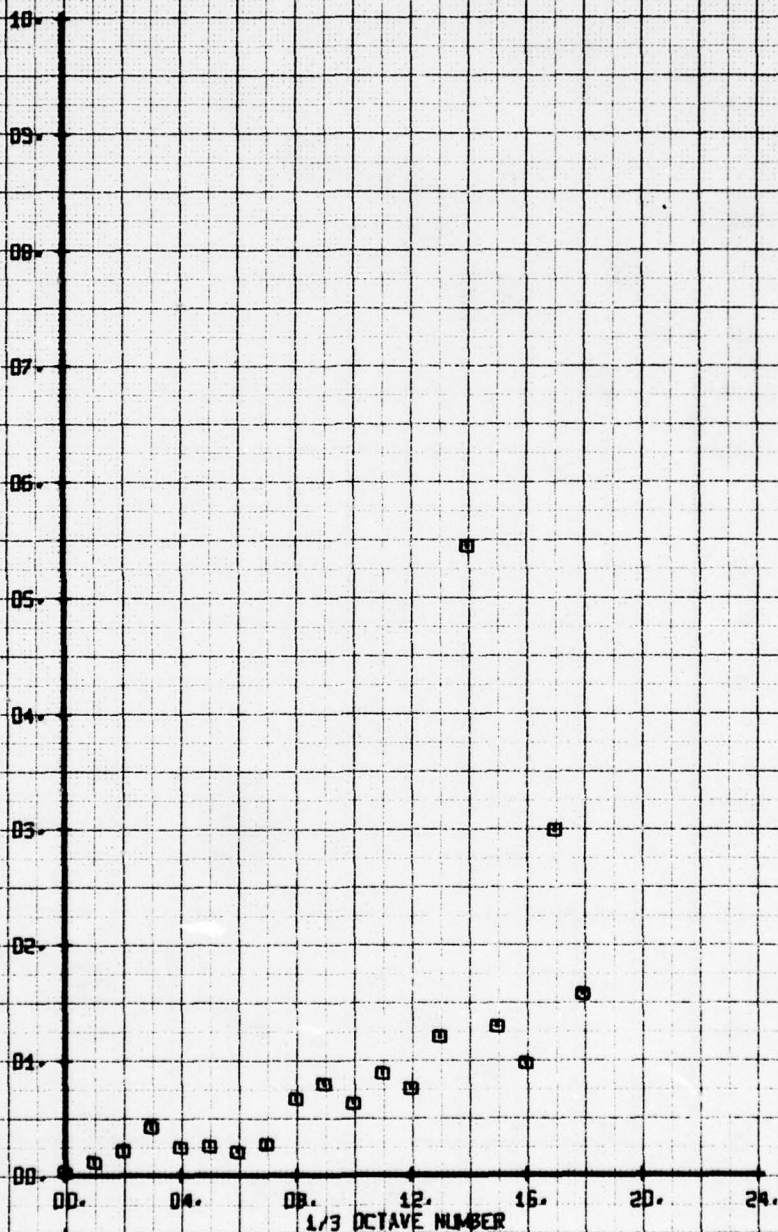
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAIN
RUN 155 TP 6

SYM
□

CH
65

LEGEND
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



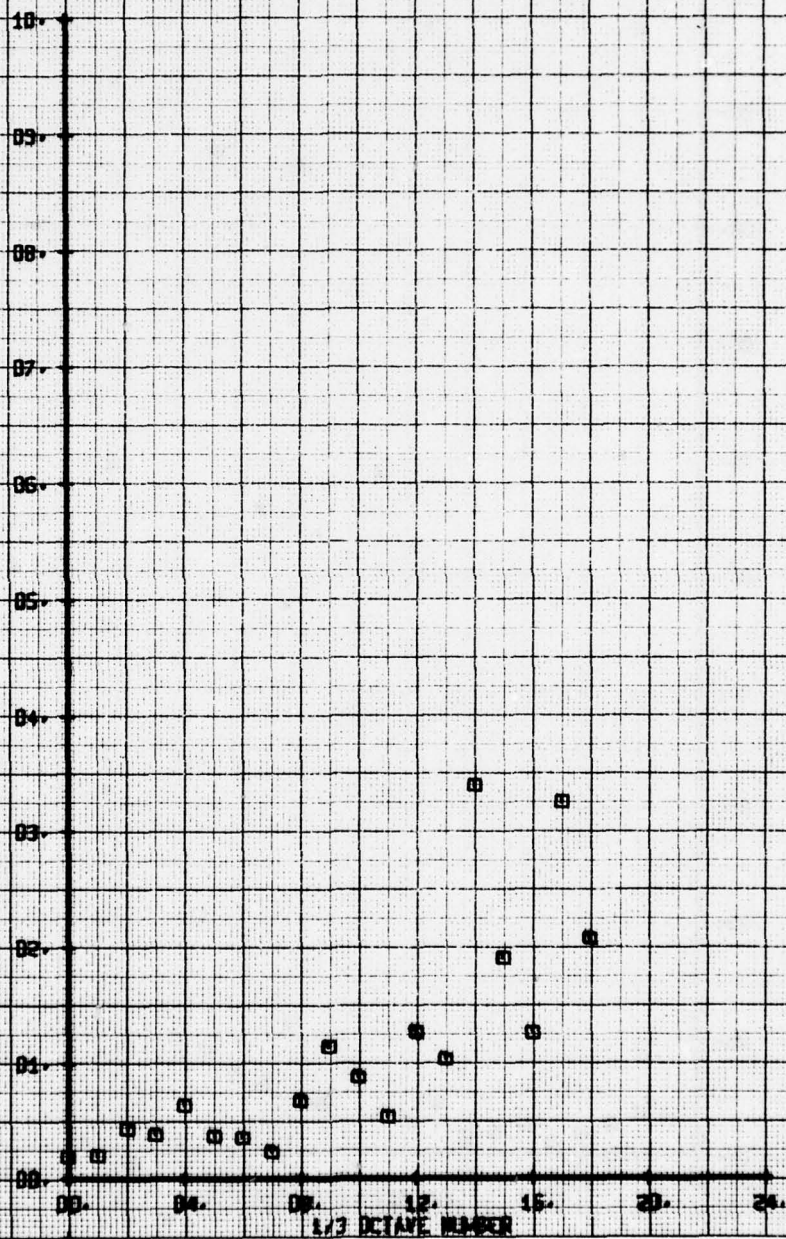
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 7

SYM
□

CH
65

LEGEND
PARAMETER
BETA

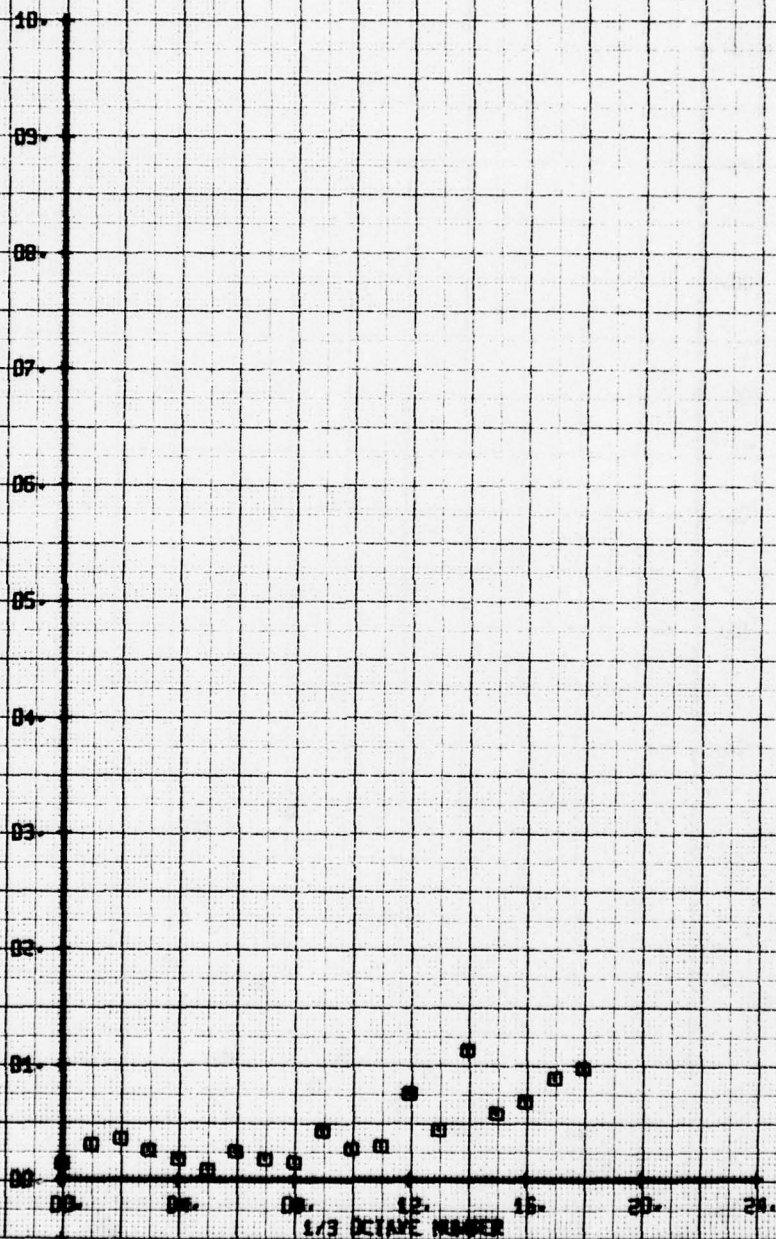
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAIN
RUN 155 TP 0

LEGEND
SYM CH PARAMETER
0 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



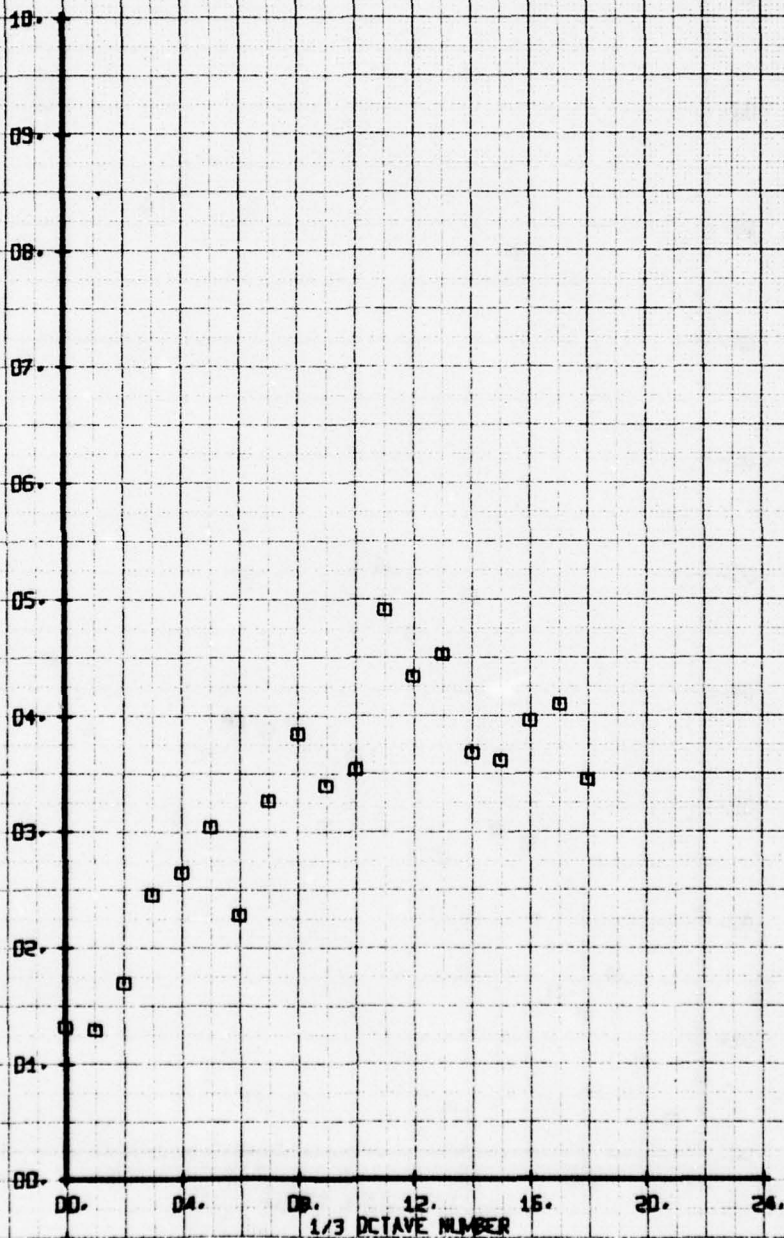
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 2

SYM
□

CH
66

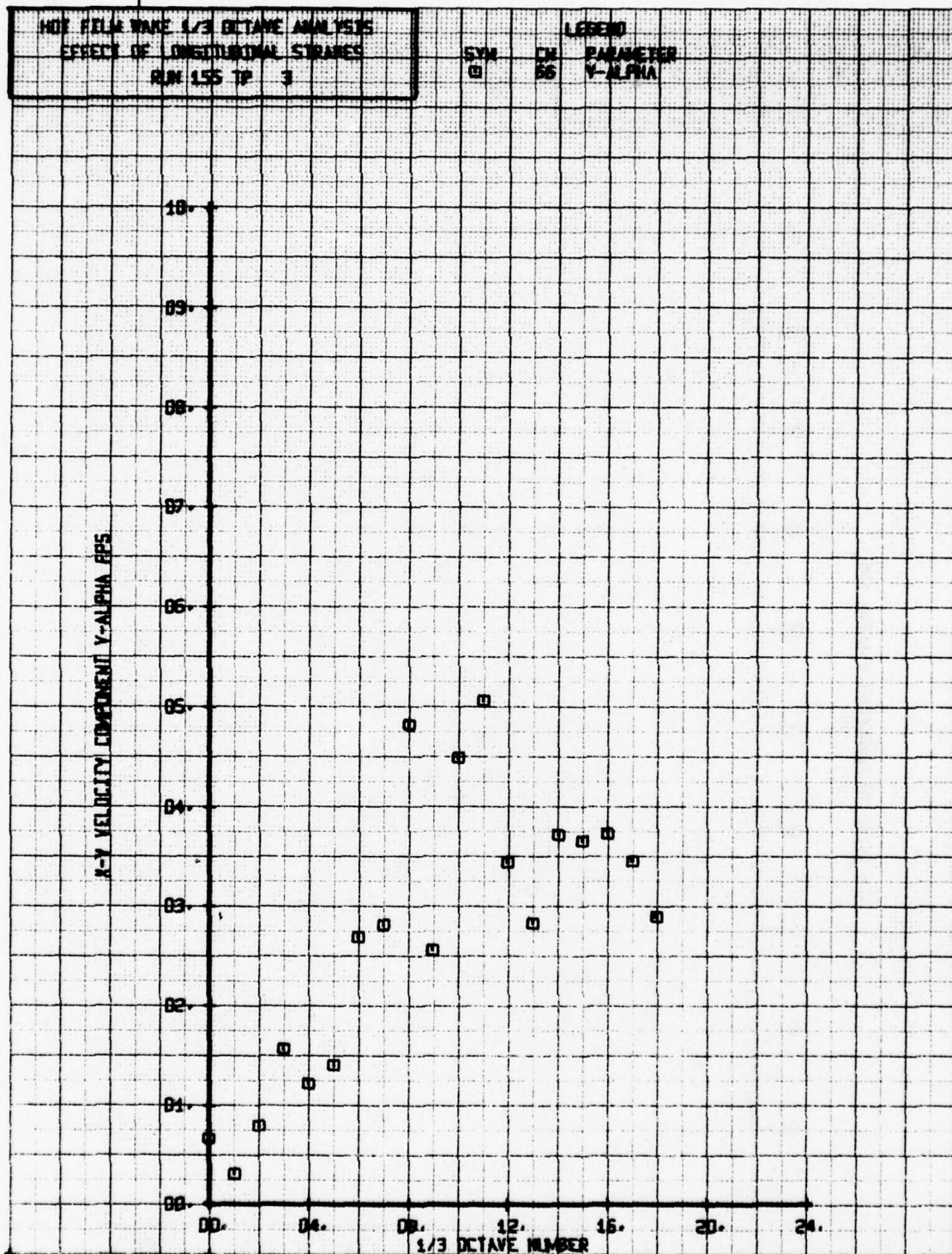
LEGEND
PARAMETER
Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA FPS



NOISE FIELD WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAINS
RUN 155 TP 3

LEGEND
SYM CN PARAMETER
□ 56 Y-ALPHA



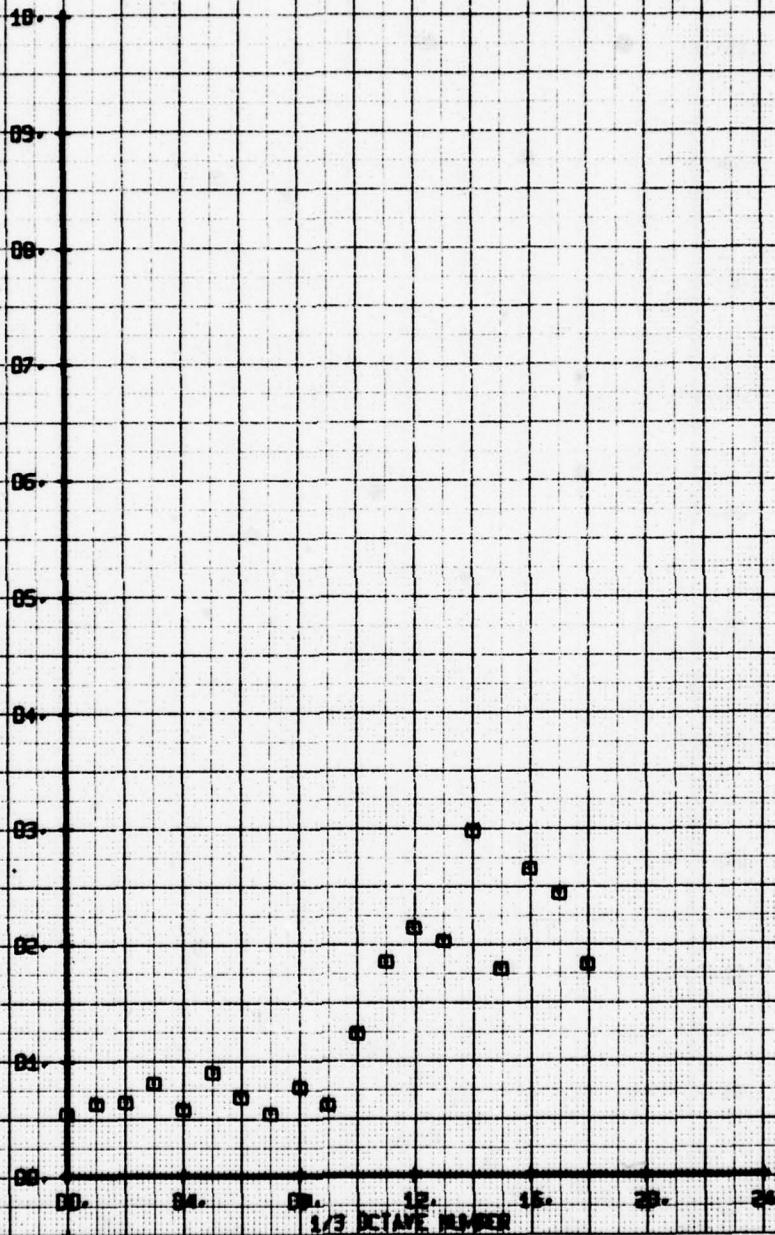
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 4

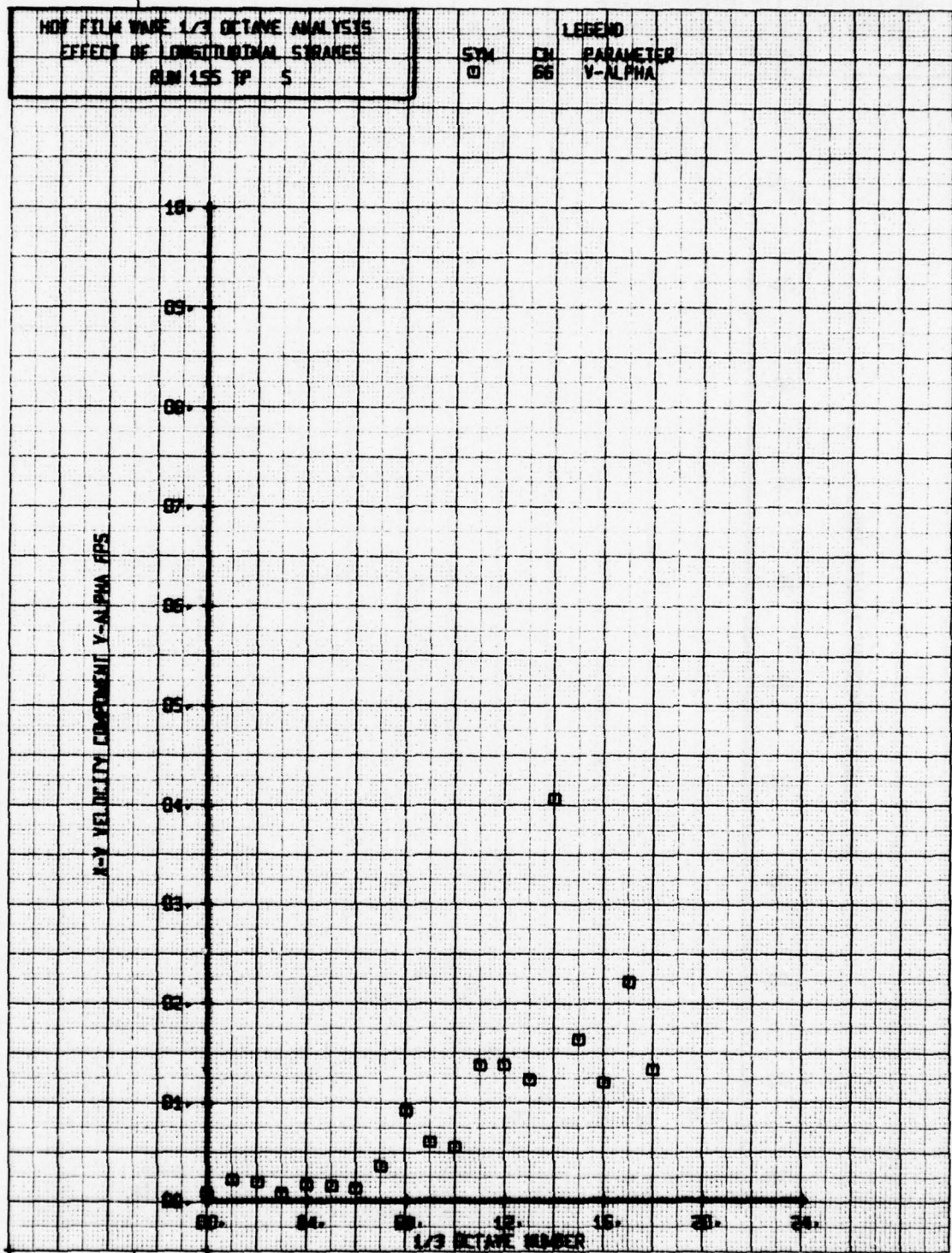
SYM
□

CH
66

LEGEND
PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS

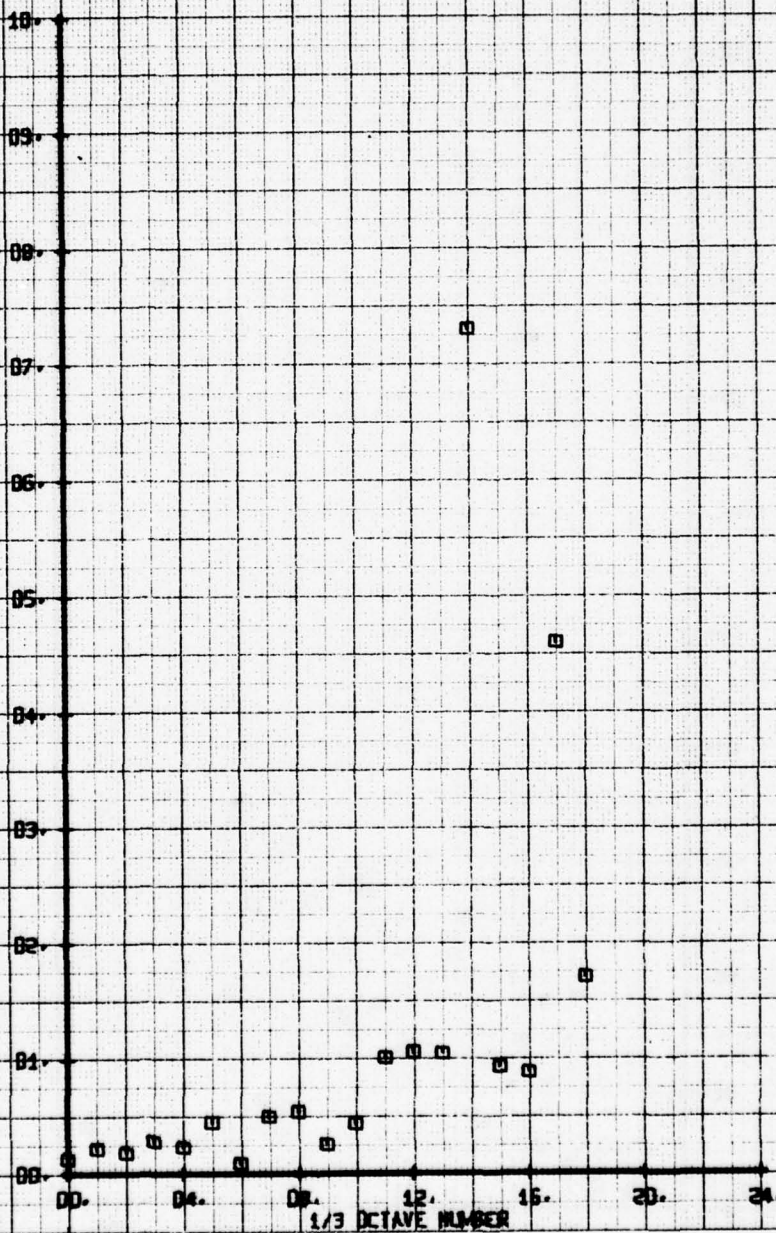




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 EFFECT OF LONGITUDINAL STRAIN
 RUN 155 TP 6

LEGEND
 SYM CN PARAMETER
 □ 56 Y-ALPHA

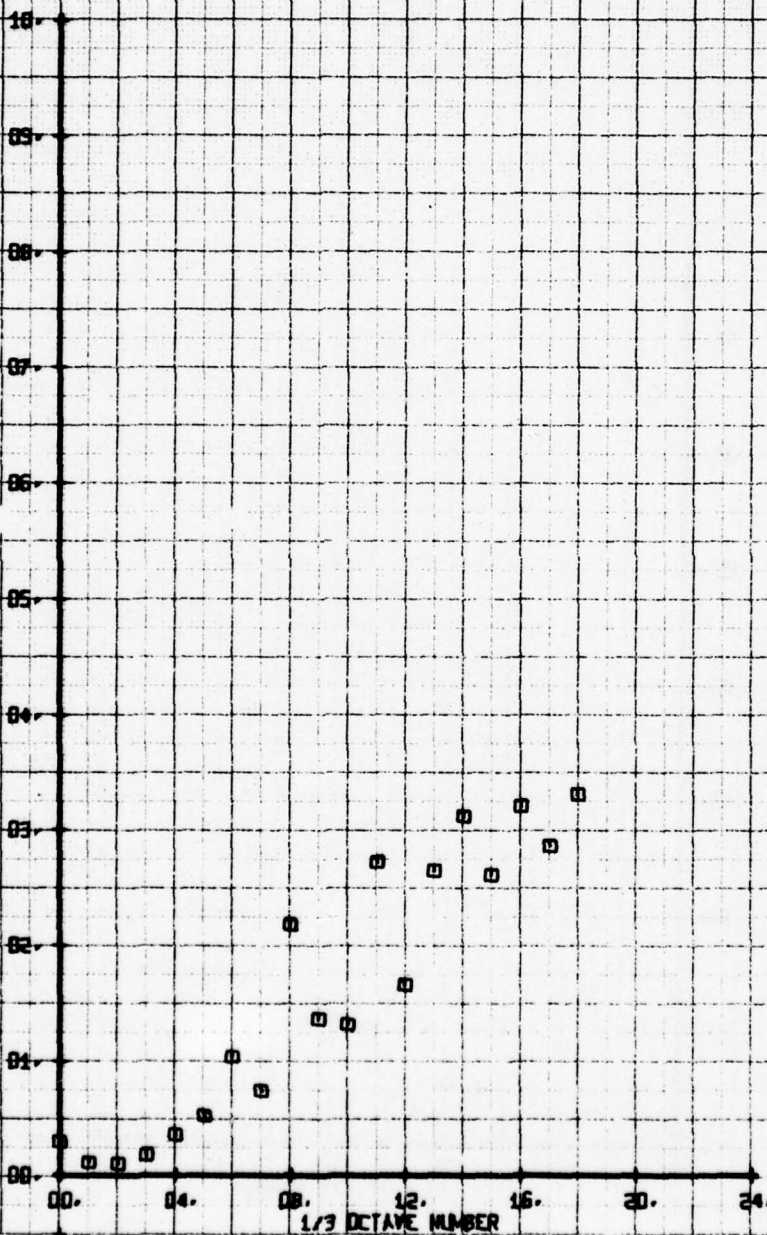
X-Y VELOCITY COMPONENT Y-ALPHA FPS



NOV FILM WAVE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 7

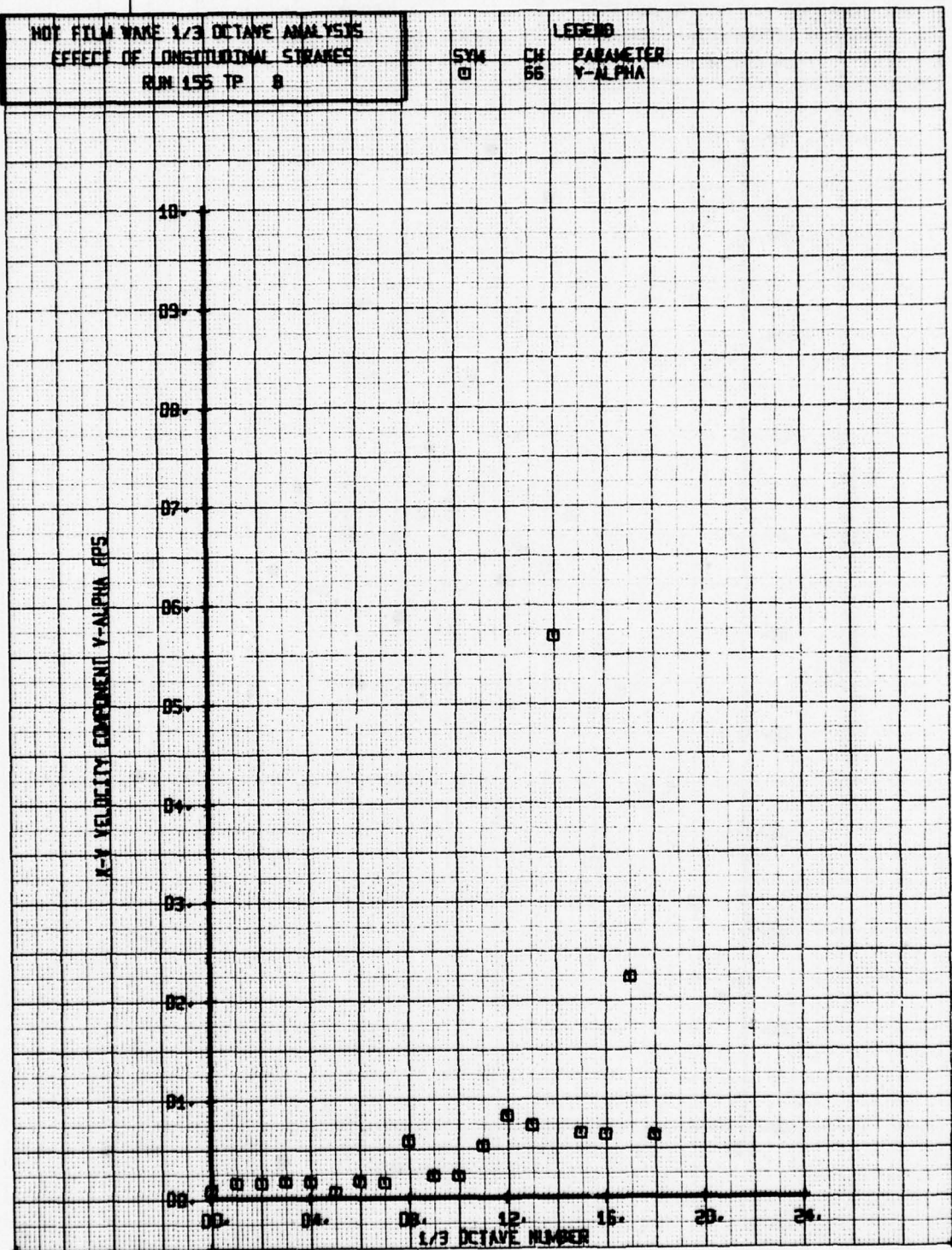
SYN CH PARAMETER
0 66 V-ALPHA

R-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 8

LEGEND
SYM CH PARAMETER
□ 66 Y-ALPHA

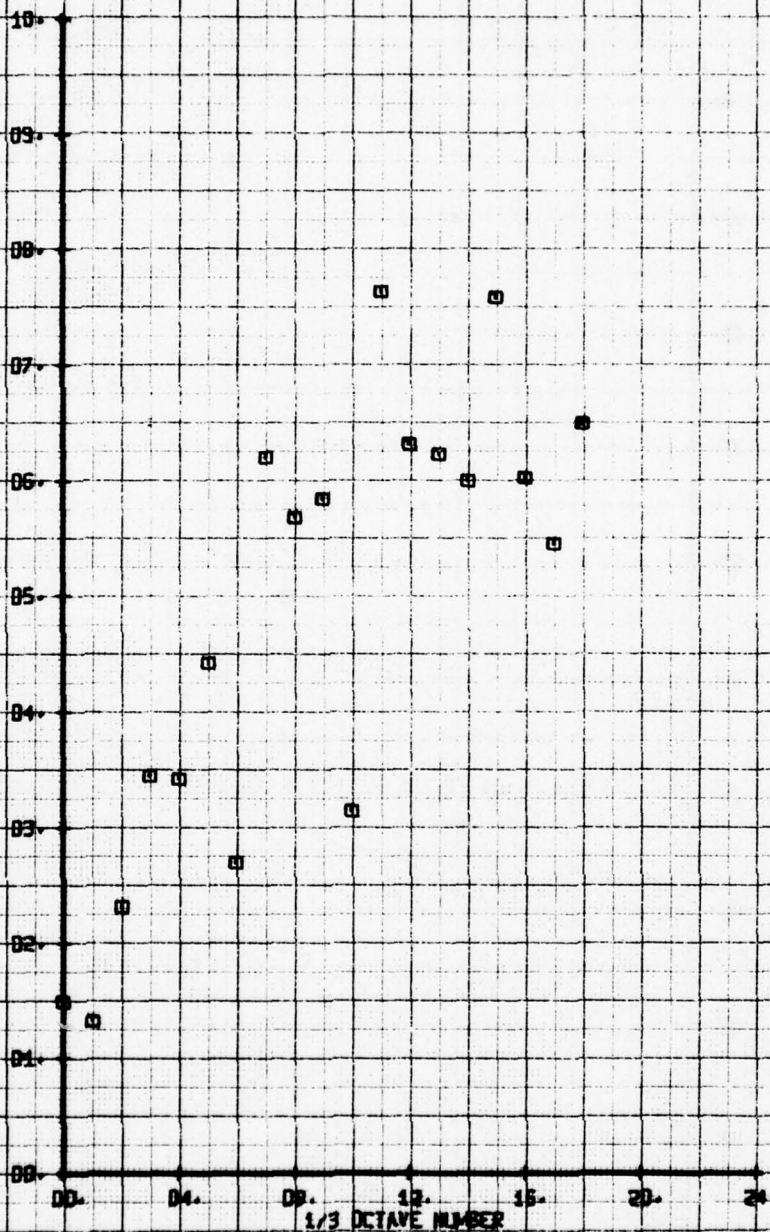


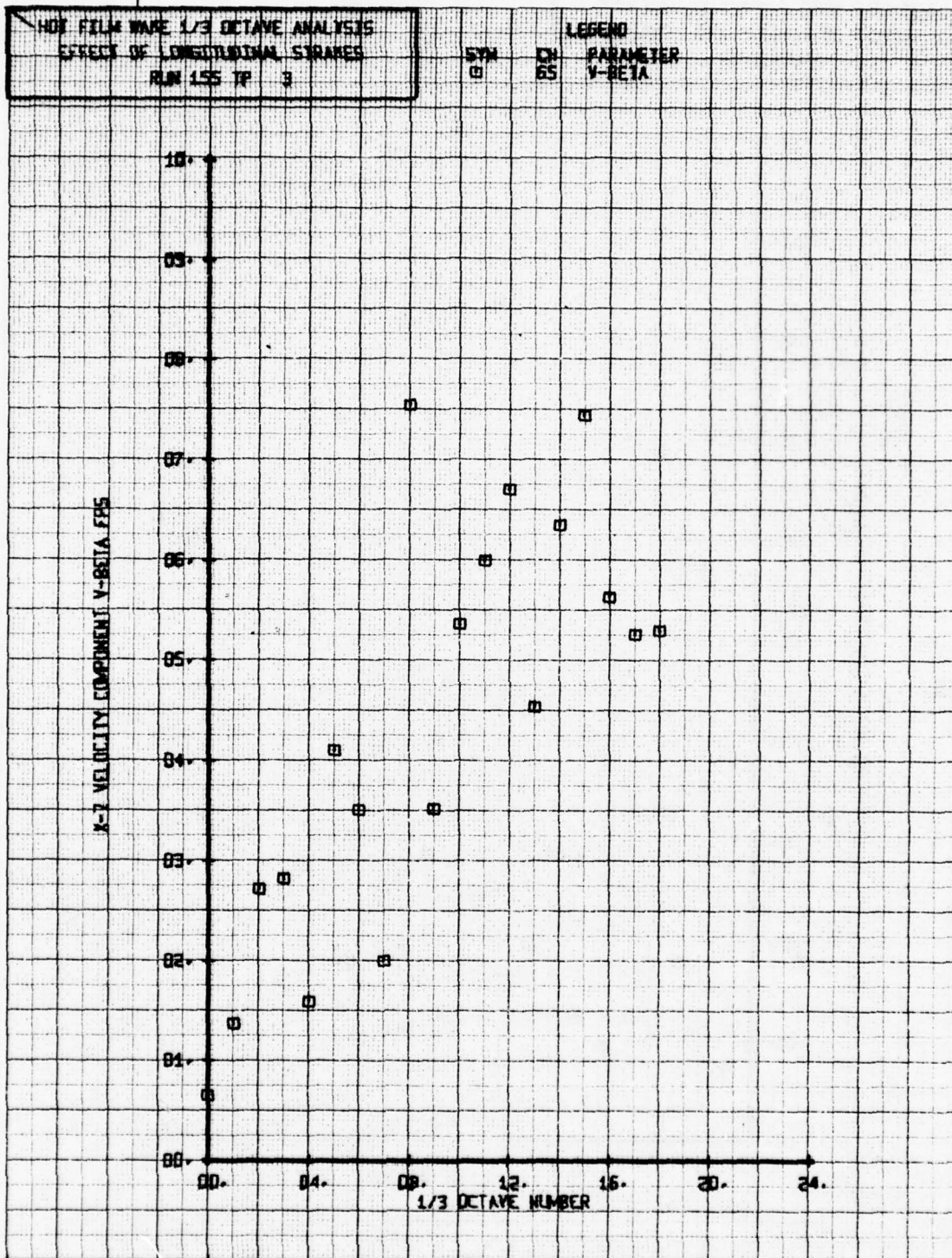
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP 2

SYM
□

LEGEND
CH 65
PARAMETER
V-BETA

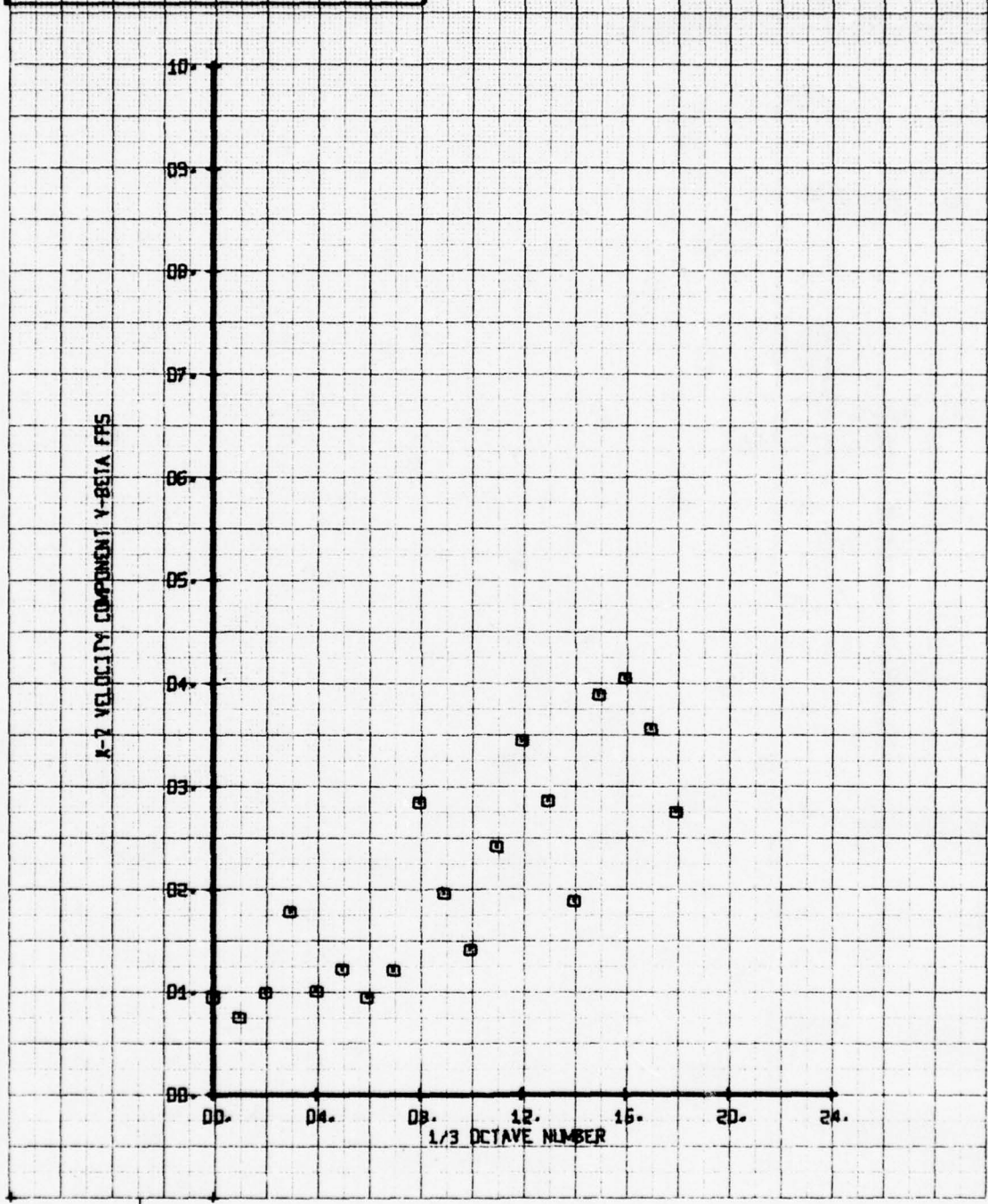
X-Z VELOCITY COMPONENT V-BETA FRS





HOT FILM WARE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAINS
RUN 155 TP 4

SYM CH PARAMETER
Q 65 V-BETA



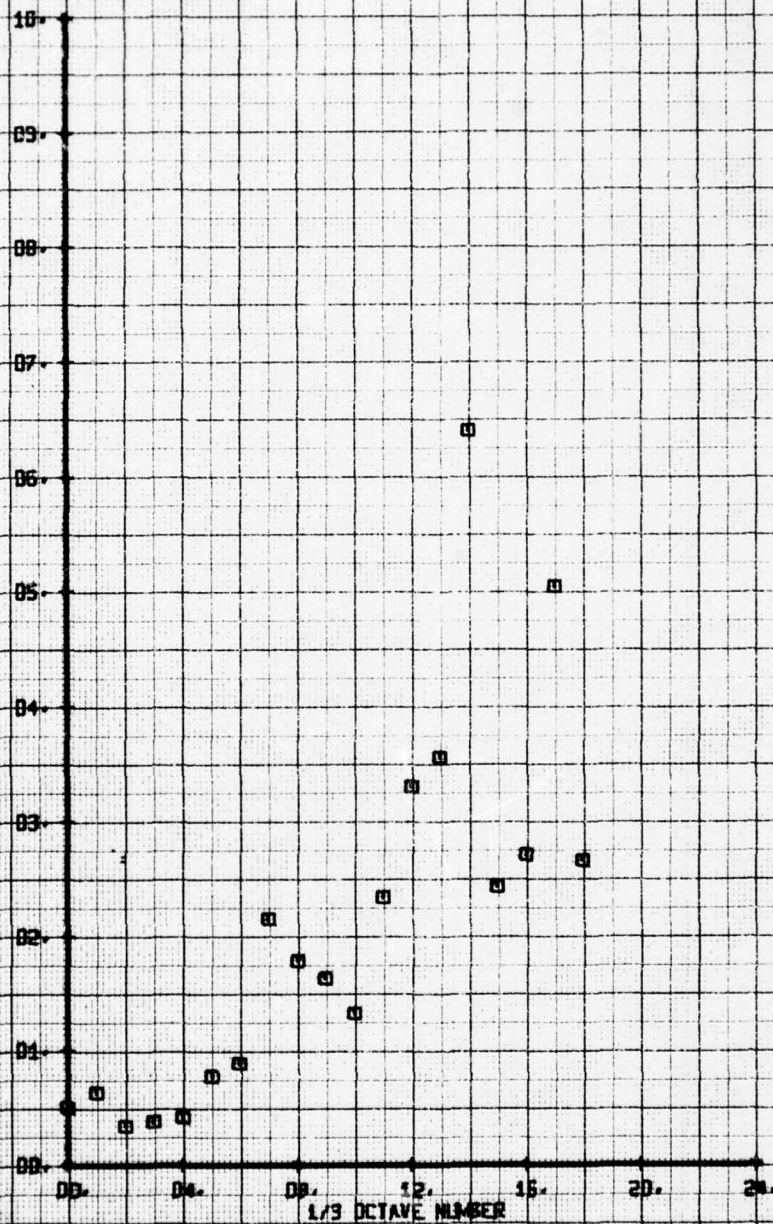
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP S

SYM
□

CH
65

LEGEND
PARAMETER
V-BETA

X-Z VELOCITY COMPONENT V-BETA FRS



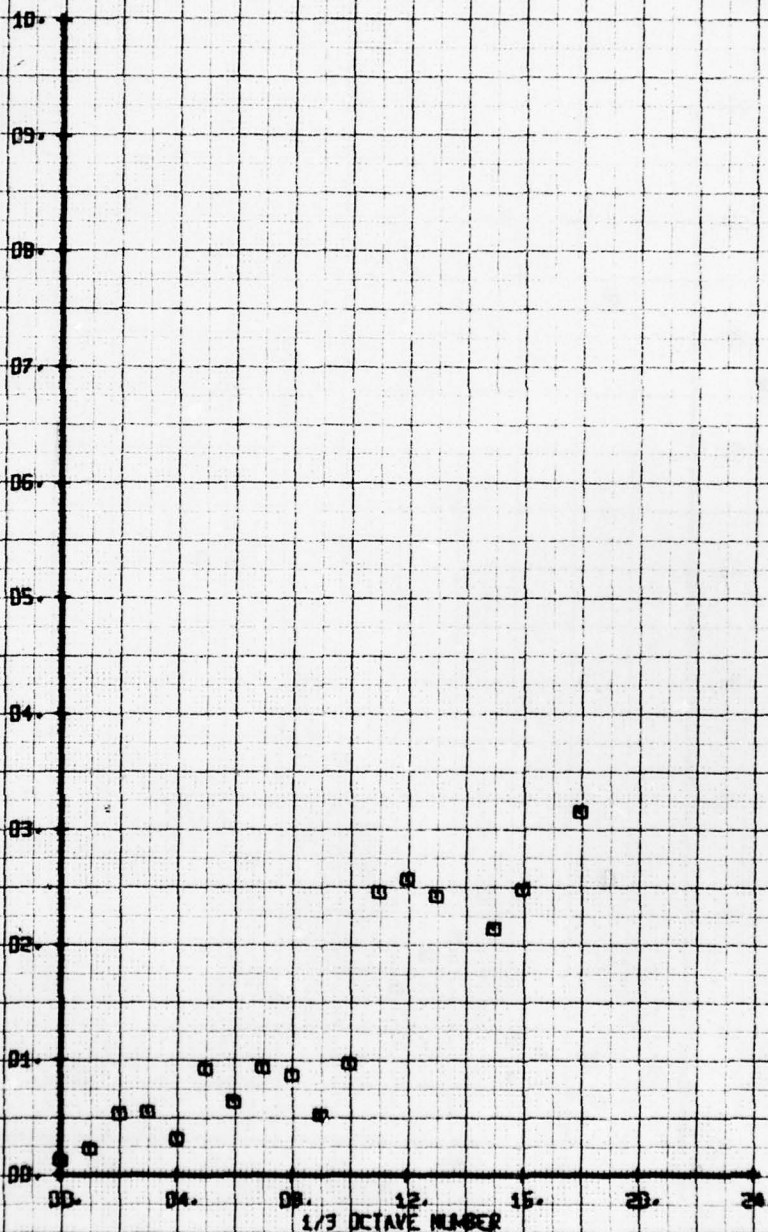
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAKES
RUN 155 TP G

SYM
□

CH
65

LEGEND
PARAMETER
V-BETA

A-7 VELOCITY COMPONENT V-BETA FPS



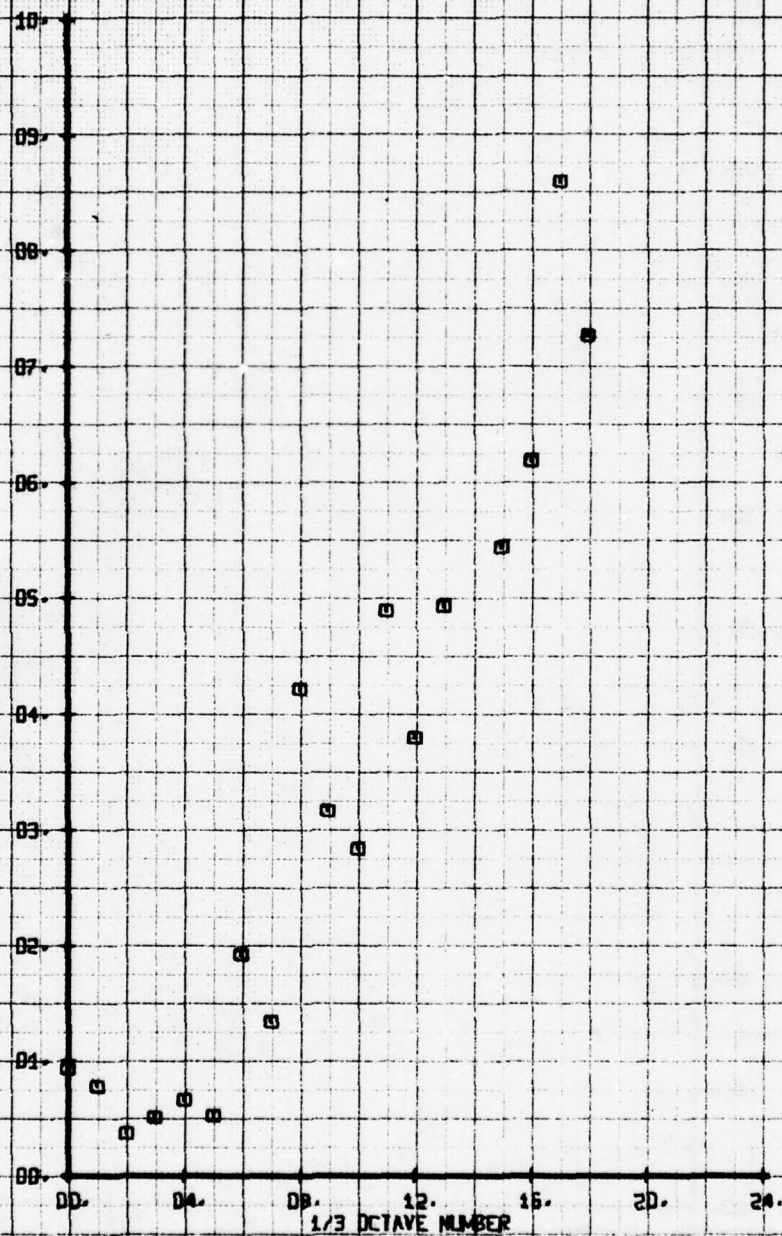
NOT FILM WARE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRAIN
RUN 155 TP 7

SYM
②

CN
65

LEGEND
PARAMETER
Y-BETA

X-2 VELOCITY COMPONENT Y-BETA FRS



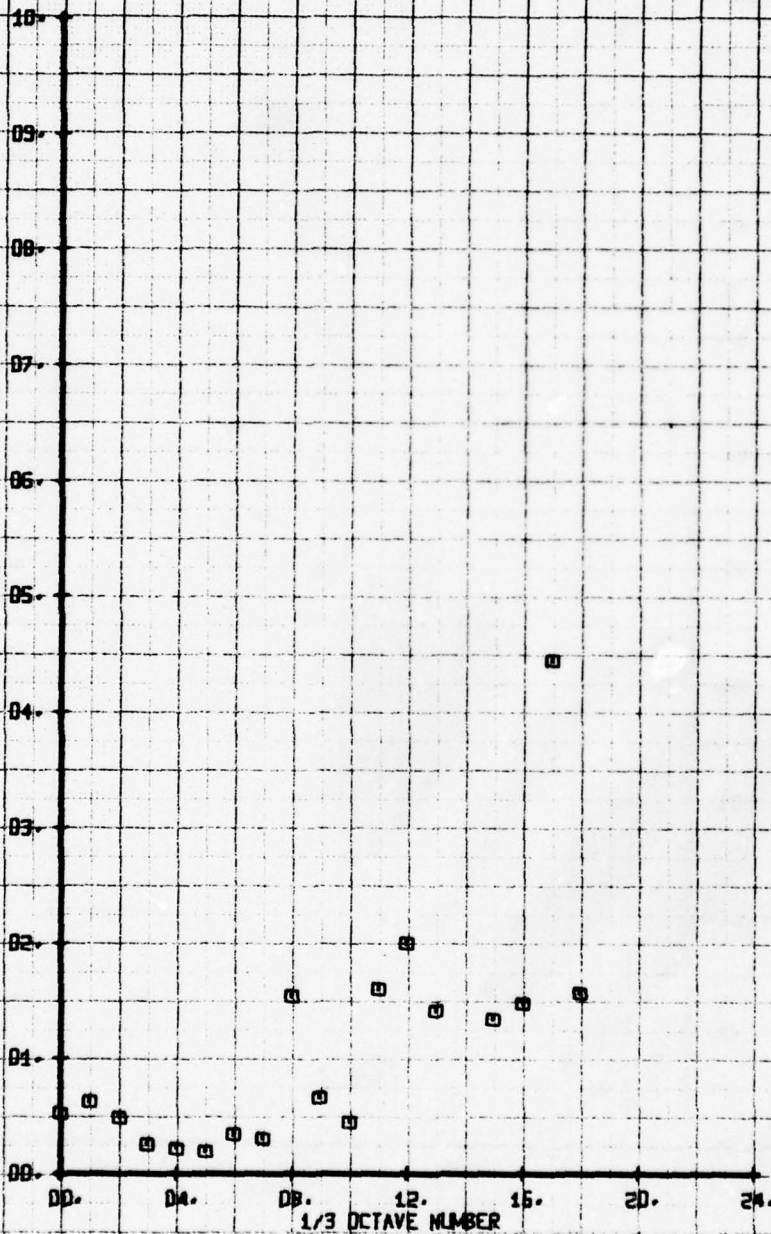
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
EFFECT OF LONGITUDINAL STRADES
RUN 155 TP 8

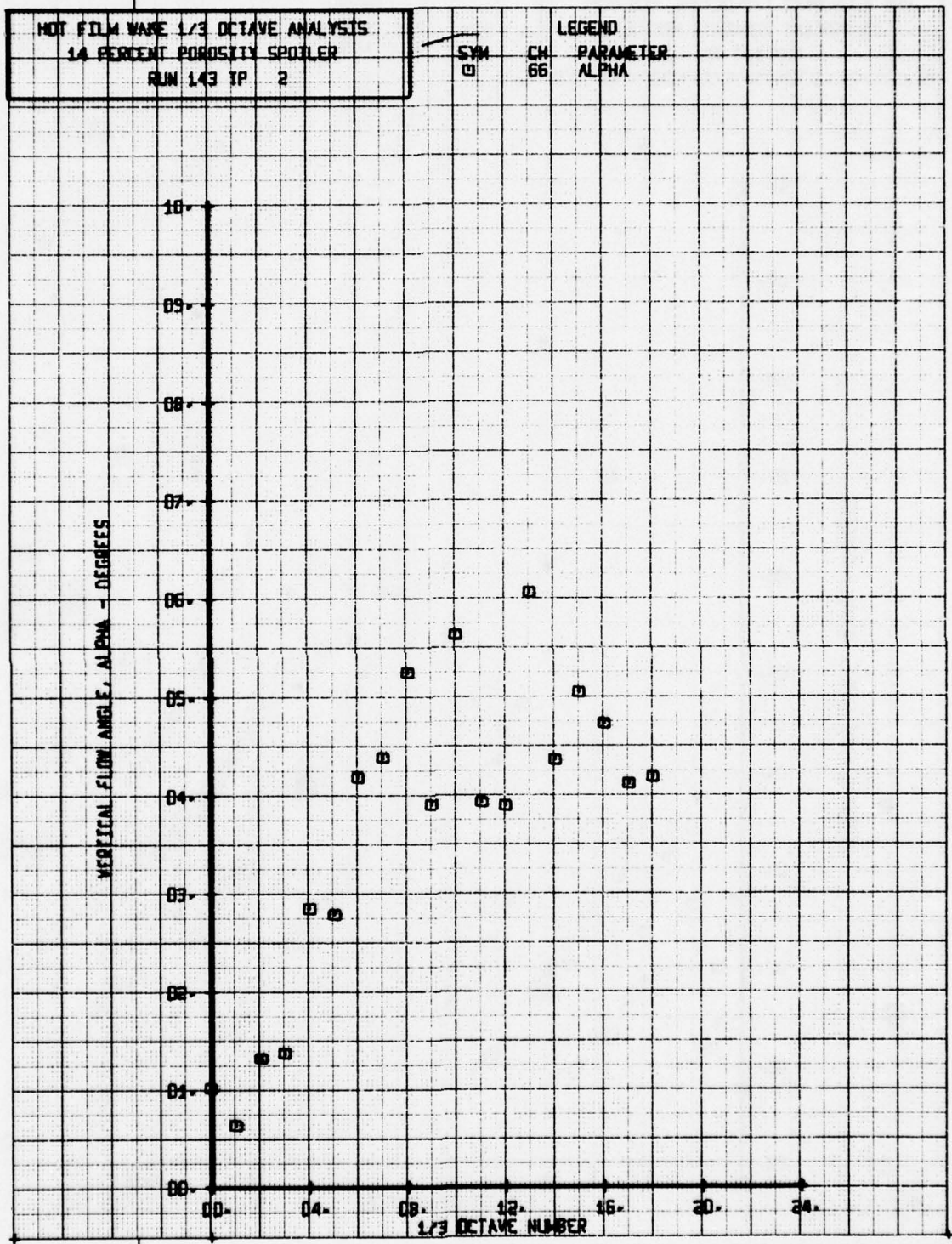
SYM
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CH
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LEGEND
PARAMETER
Y-BETA

K-2 VELOCITY COMPONENT Y-BETA FRS





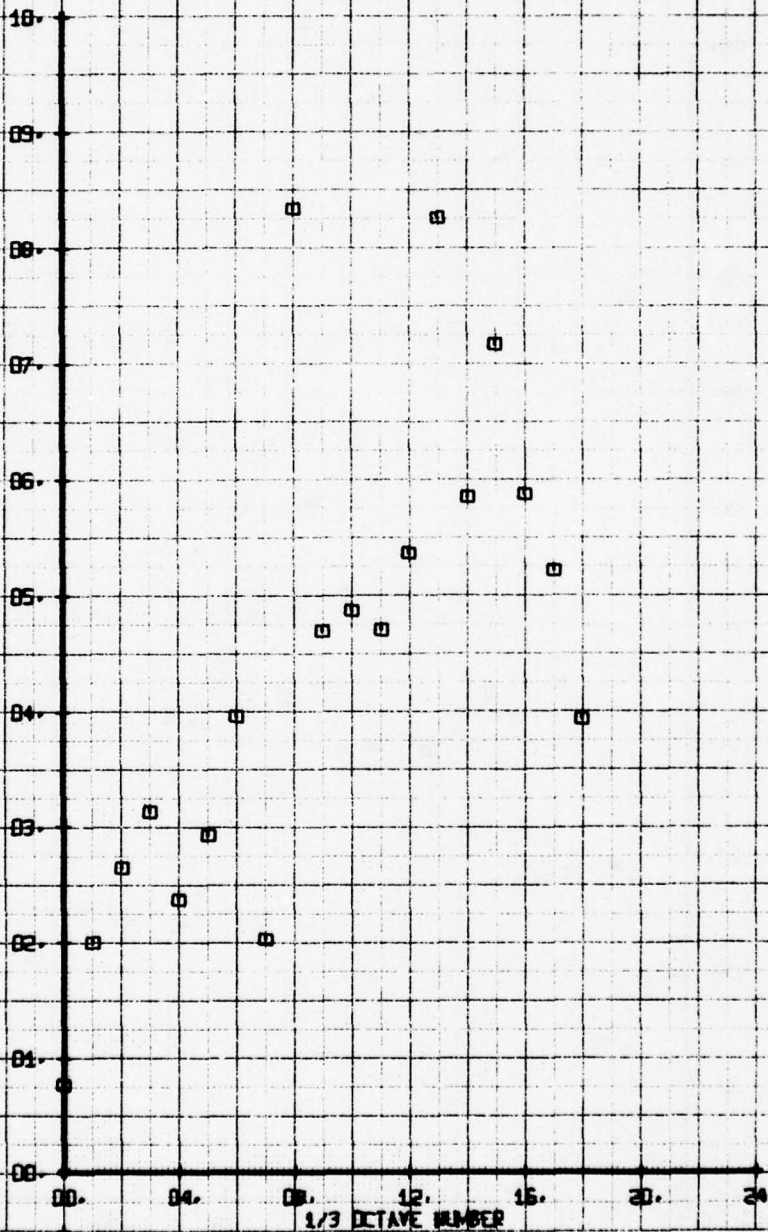
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 3

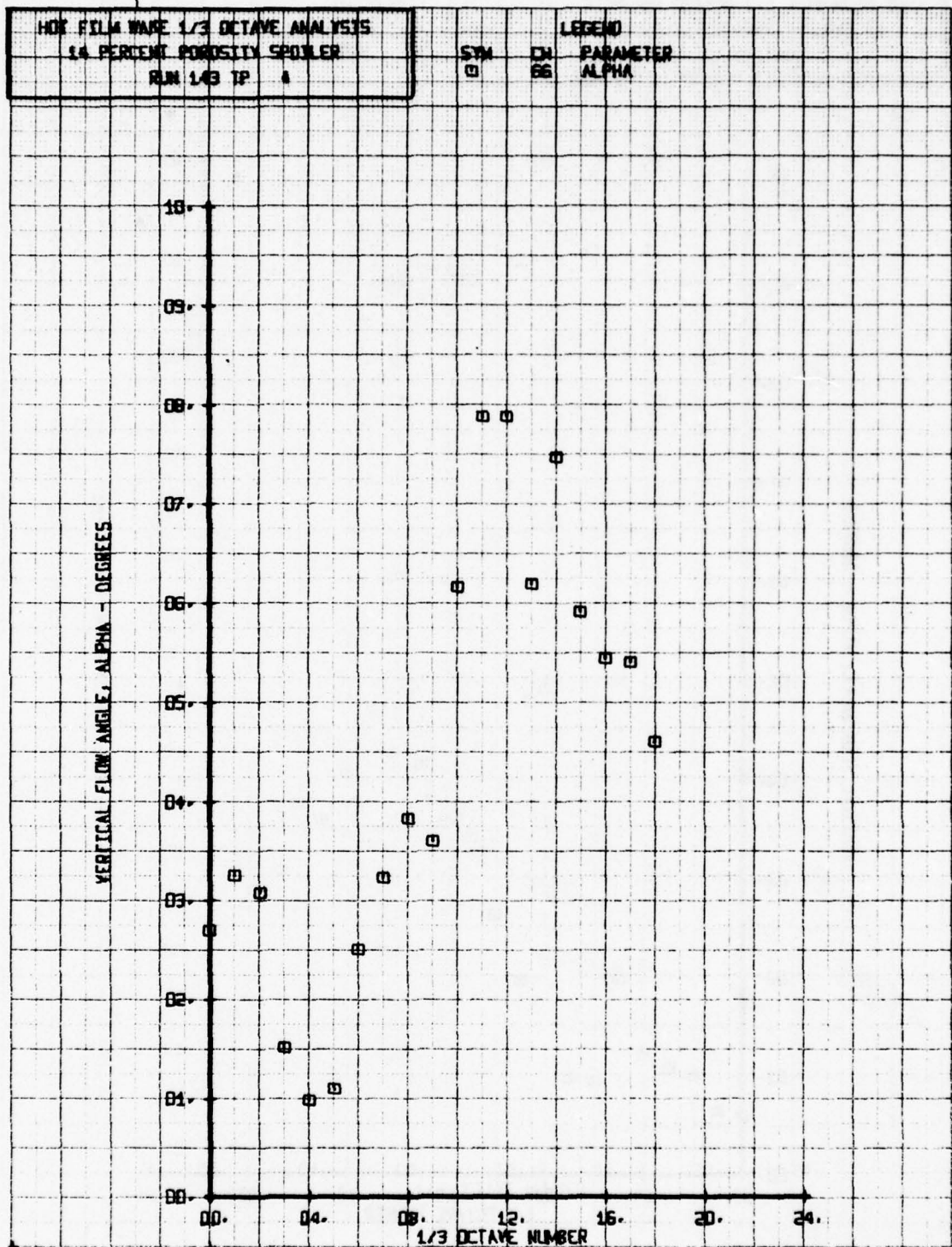
SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

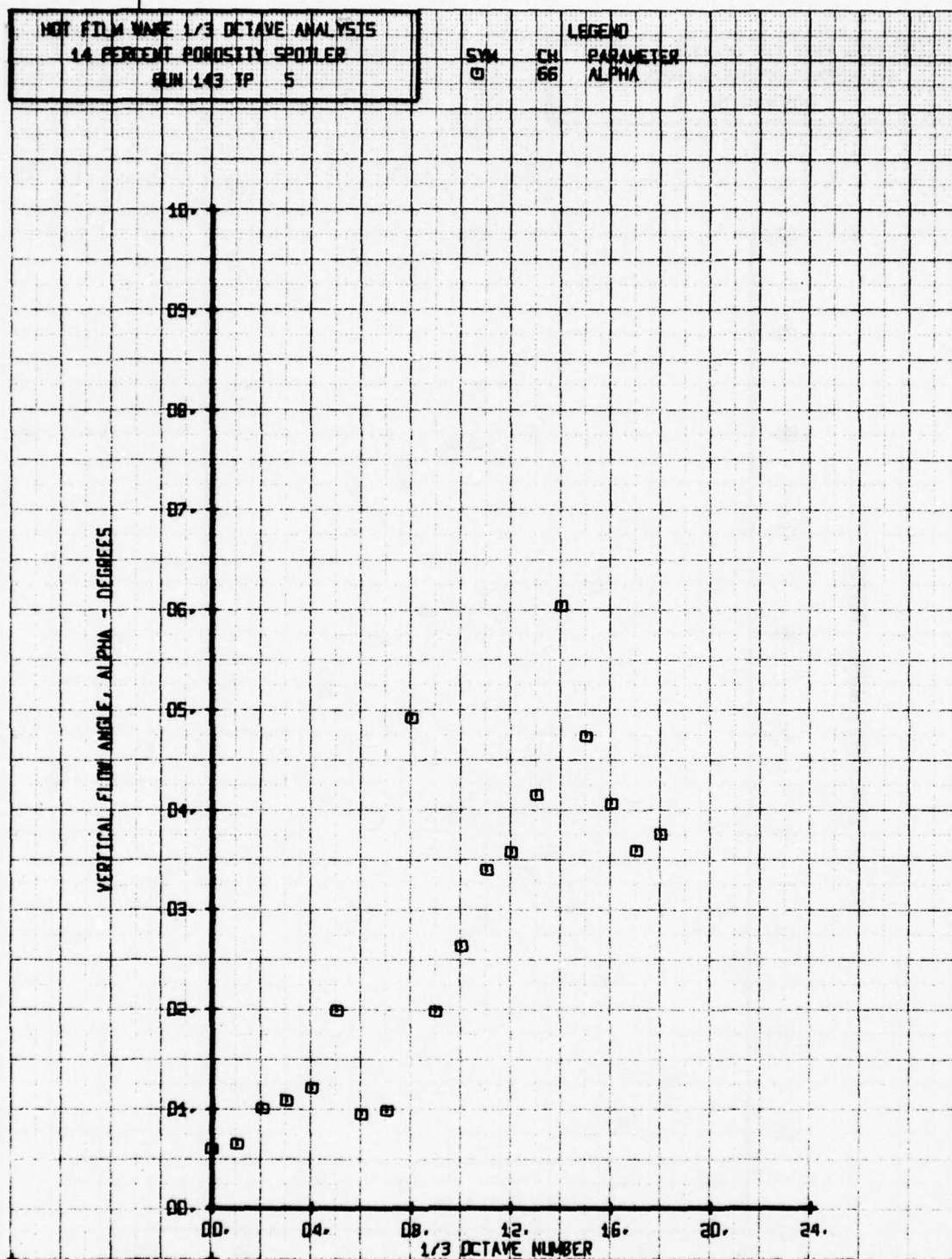
VERTICAL FLOW ANGLE, ALPHA - DEGREES





HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOTLER
 RUN 143 TP 5

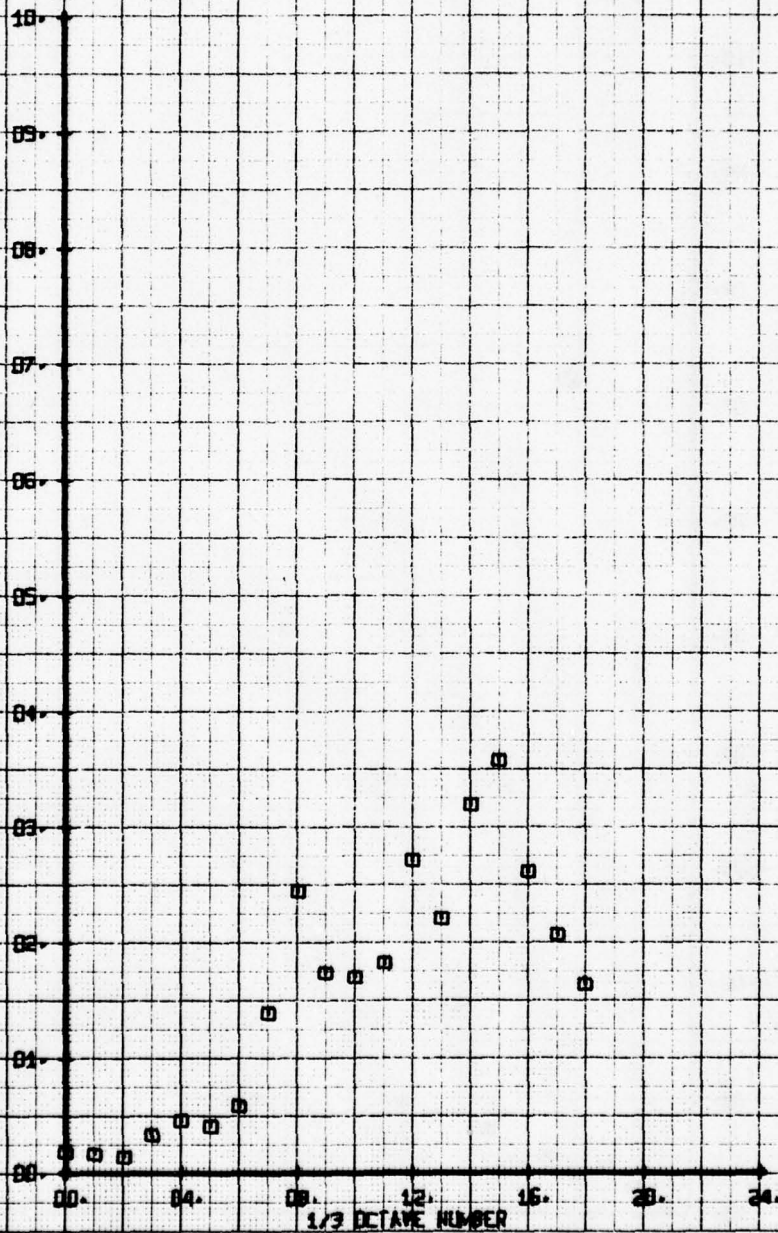
SYM	CH	LEGEND	PARAMETER
Q	66		ALPHA



HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 6

SYM CH PARAMETER
 □ 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

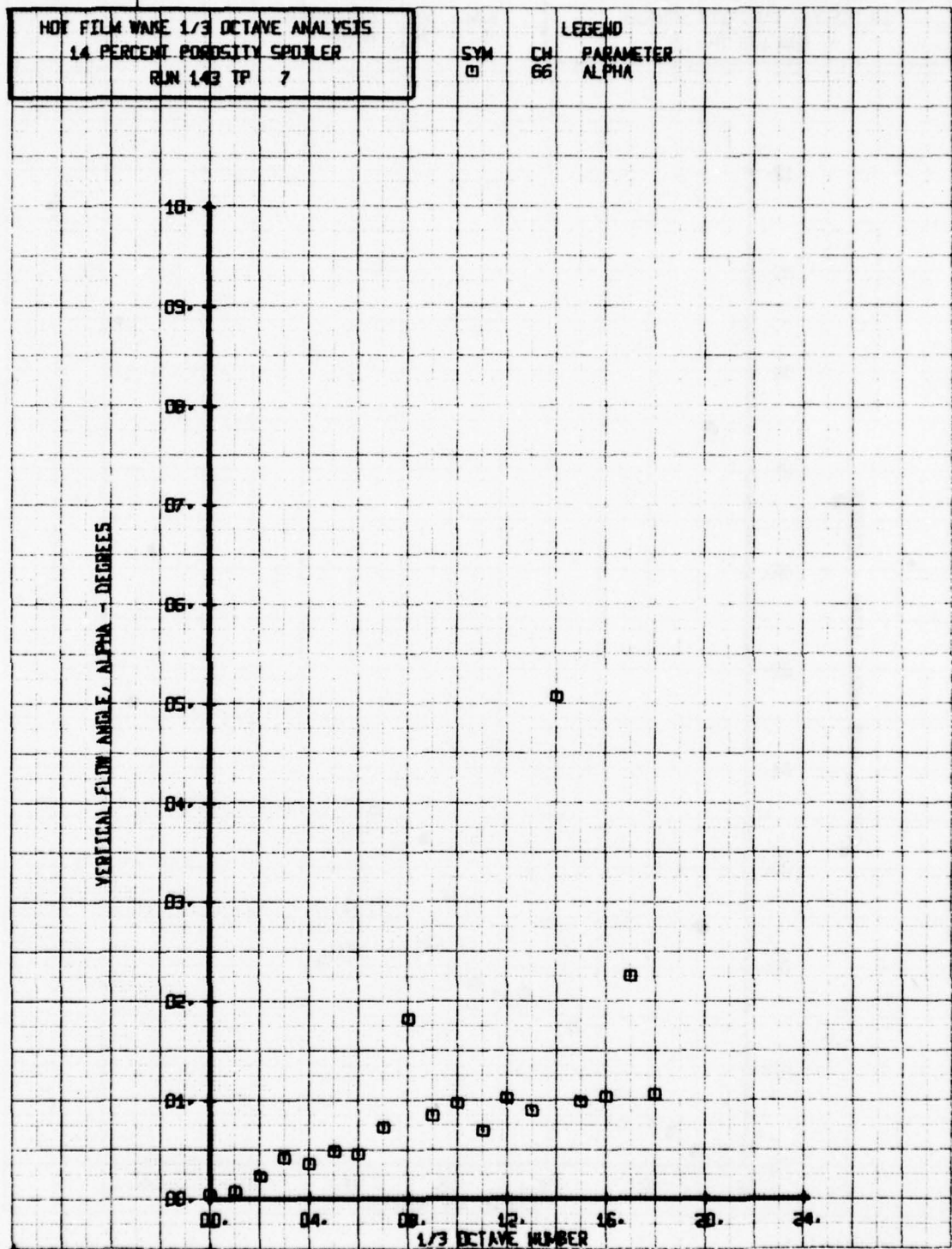


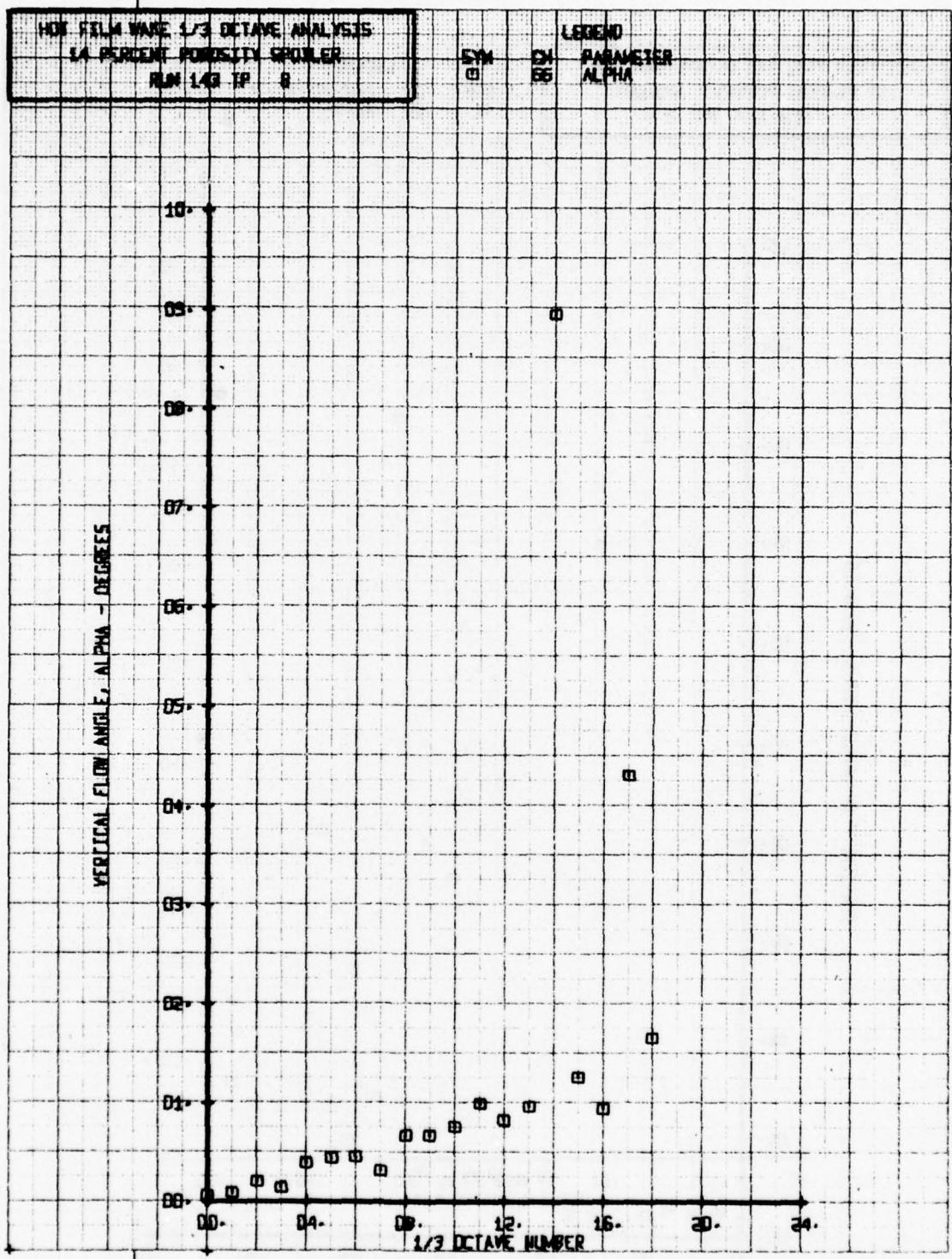
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 7

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA





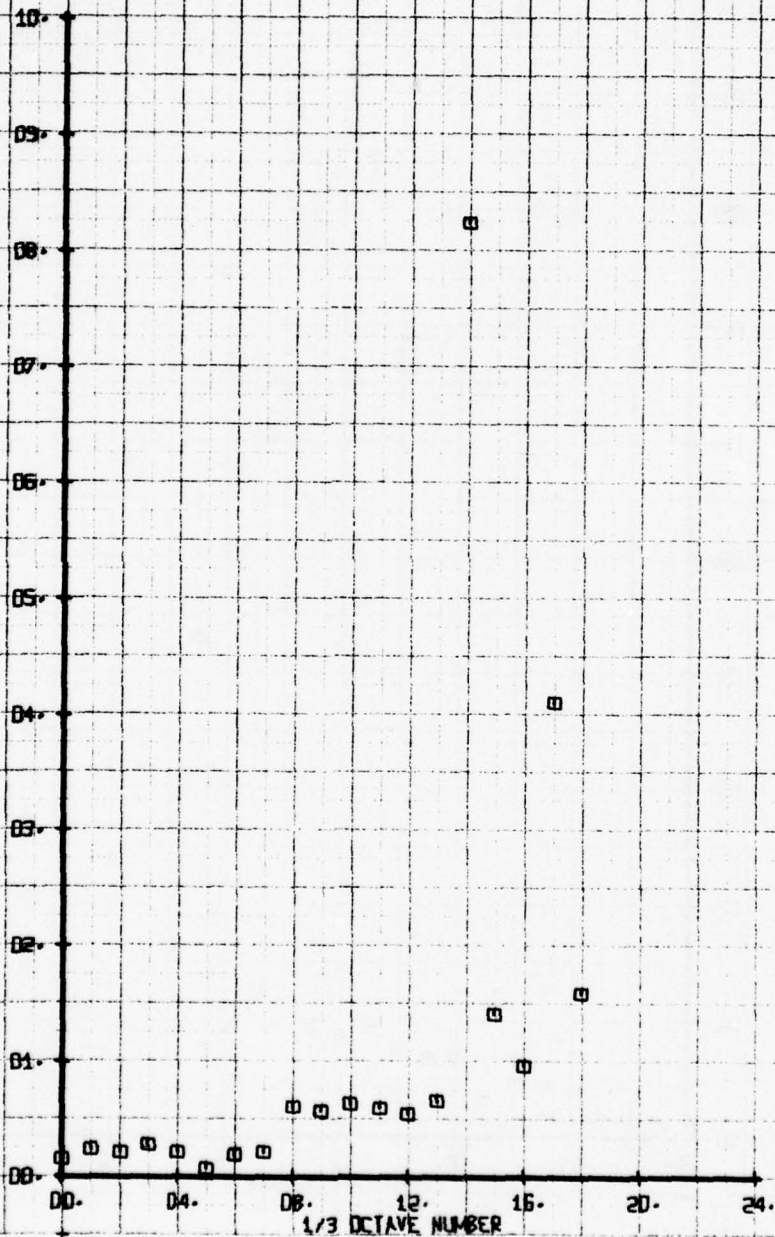
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 9

SYM
 □

CH
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LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



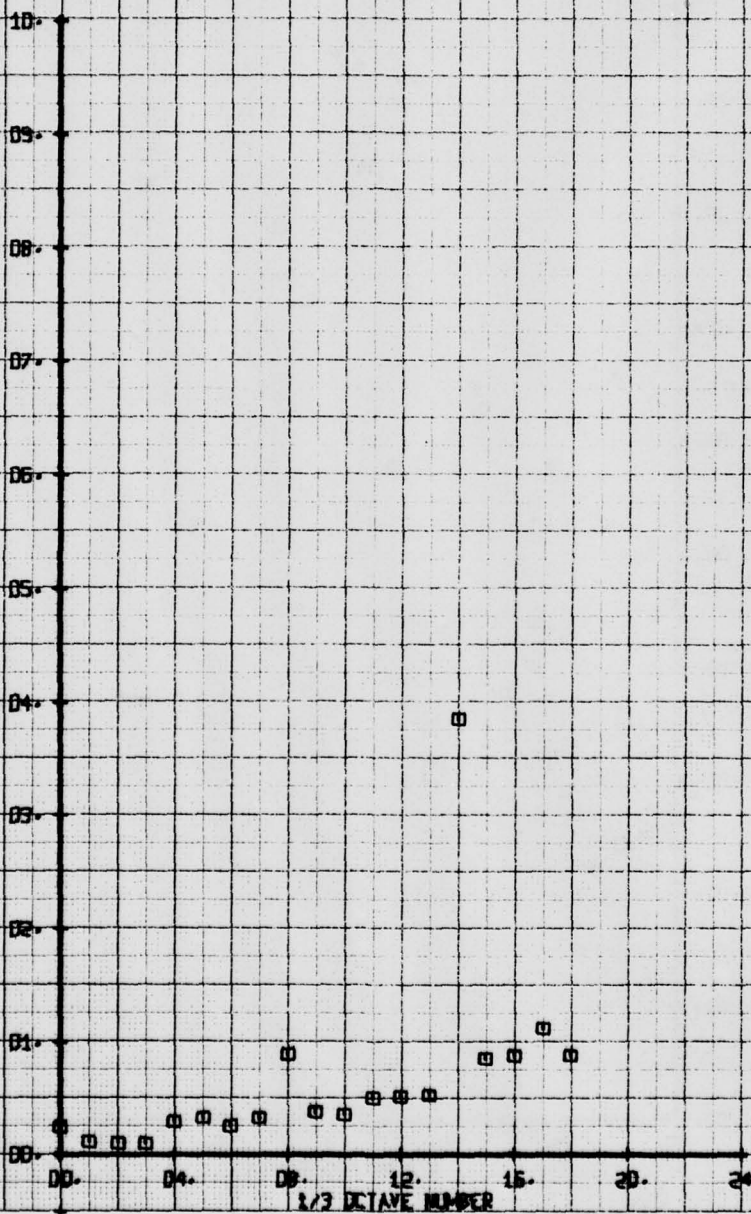
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 10

SYM
 □

CM
 56

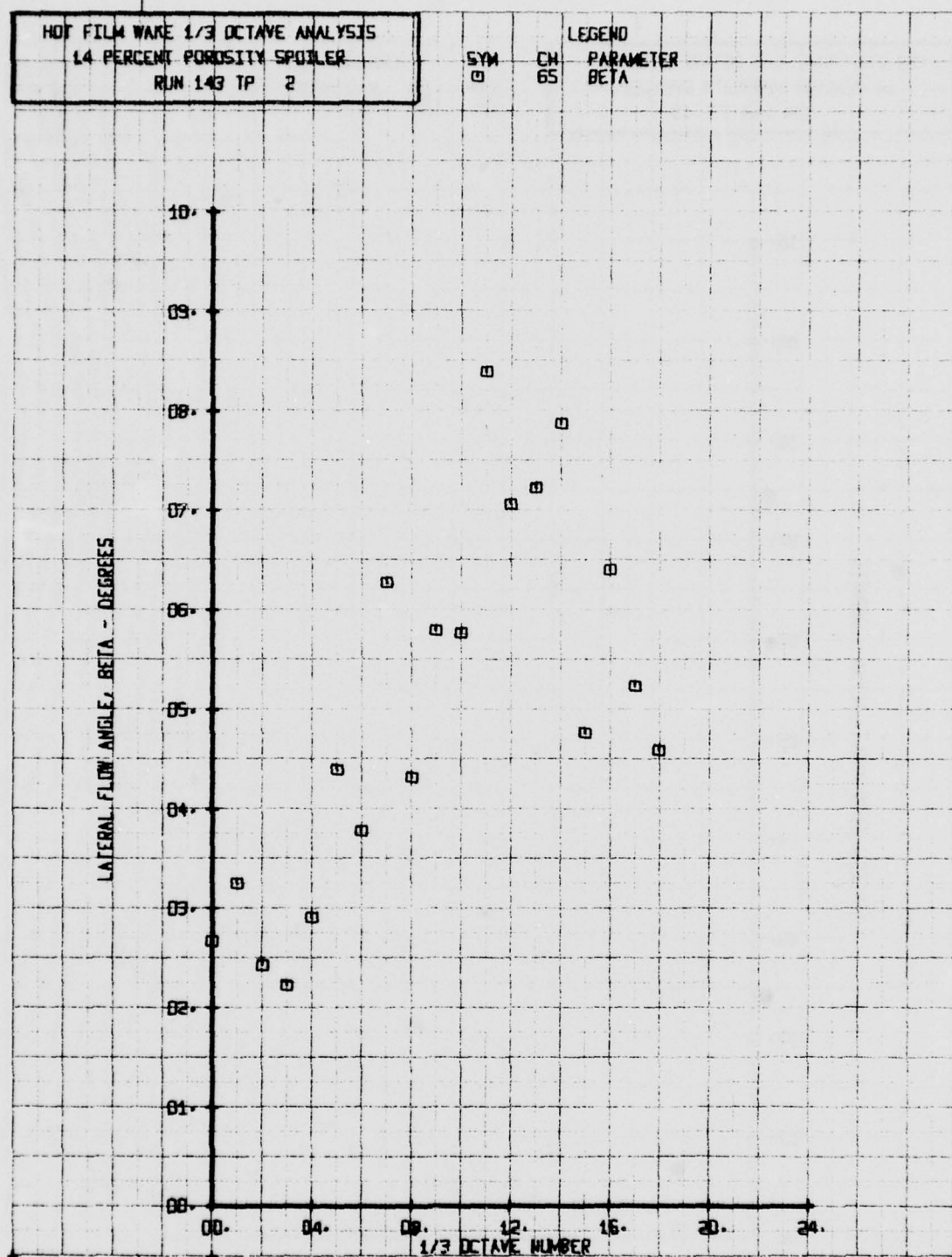
LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 2

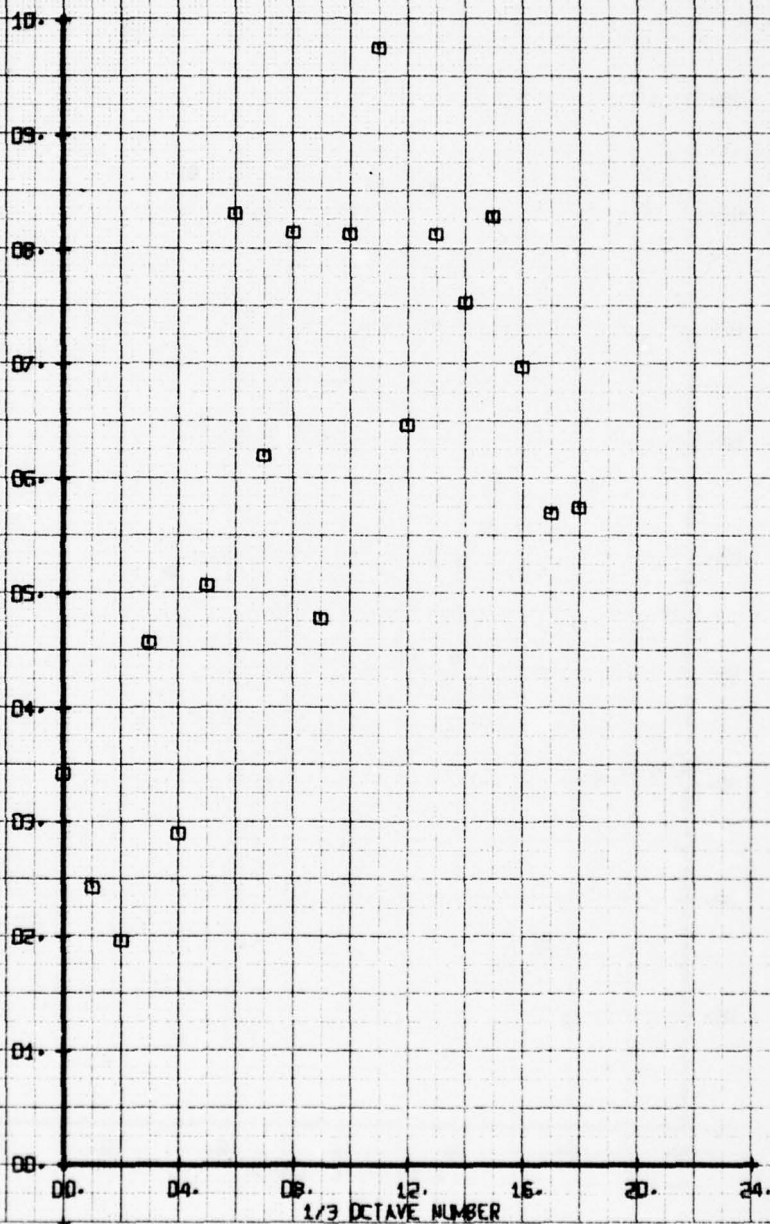
SYM CH
 65
 LEGEND
 PARAMETER
 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 3

SYM CH PARAMETER
 □ 65 BETA

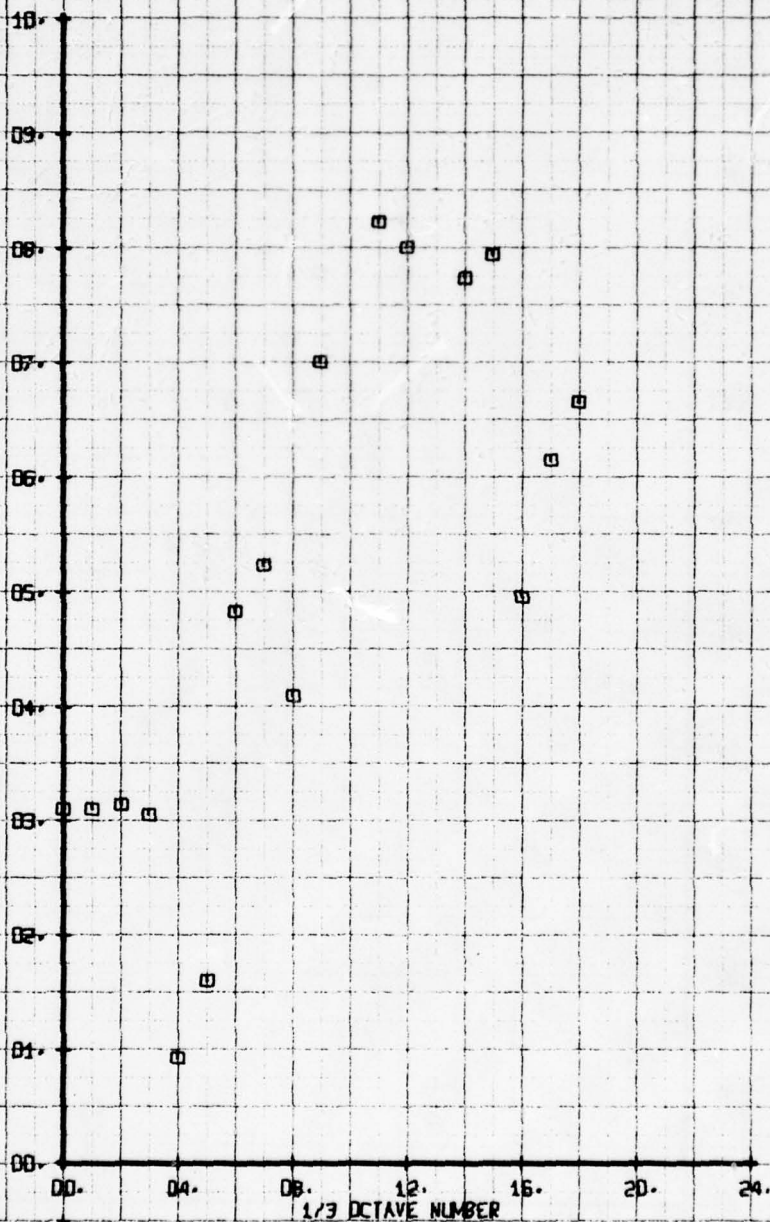
LATERAL FLOW ANGLE, BETA - DEGREES



NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 4

SYM CH PARAMETER
 □ 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



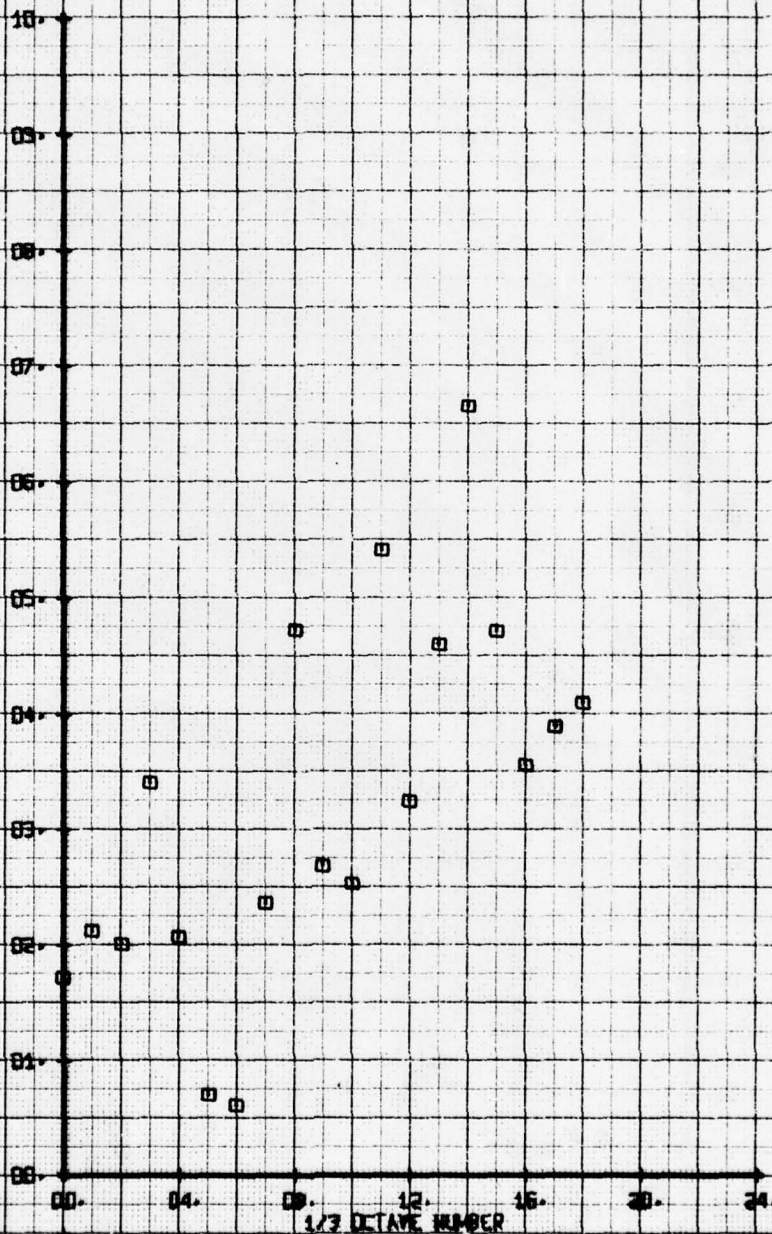
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
14 PERCENT POROSITY SPOILER
RUN 143 TP 5

SYM
□

CH
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LEGEND
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



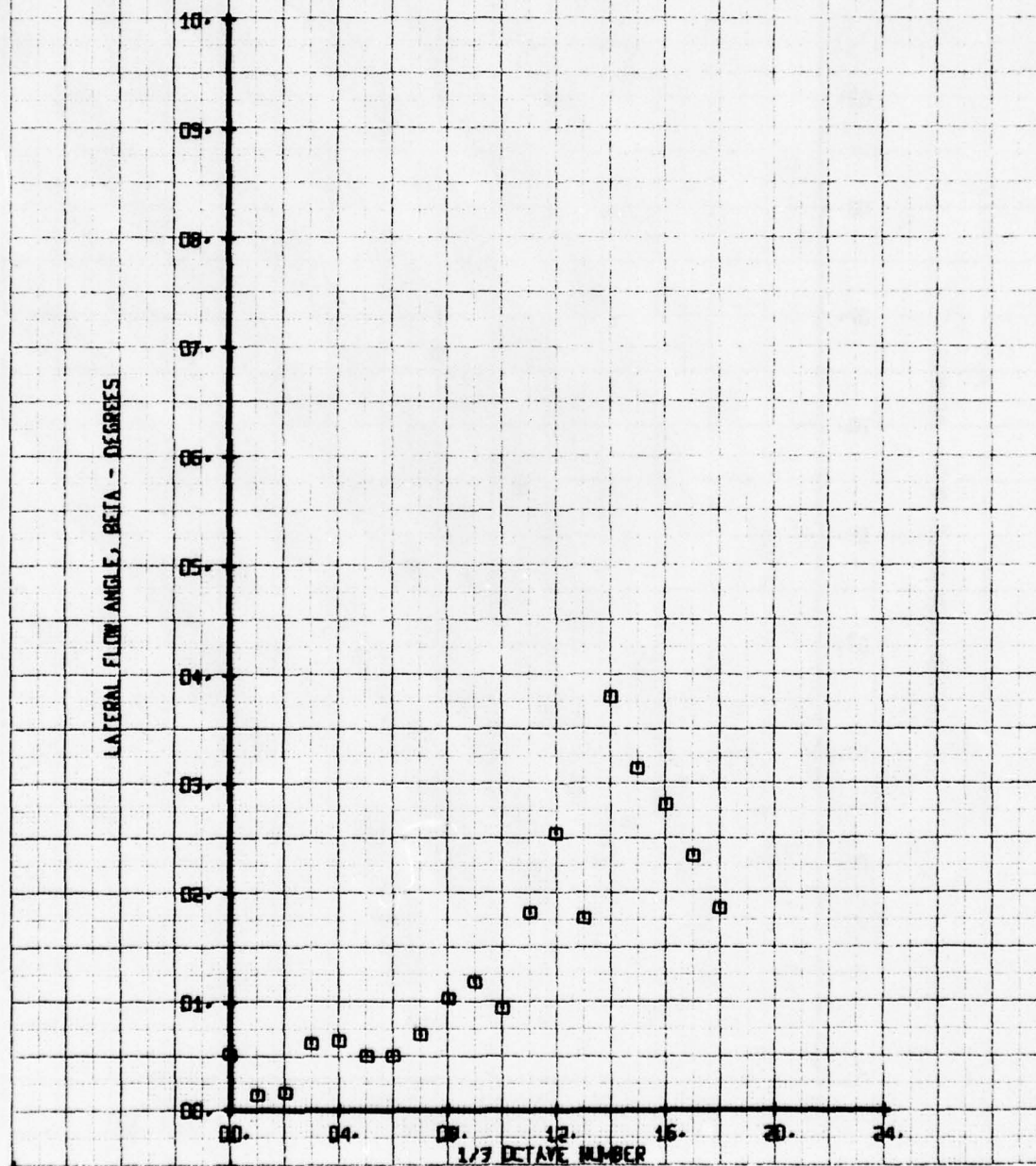
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 6

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

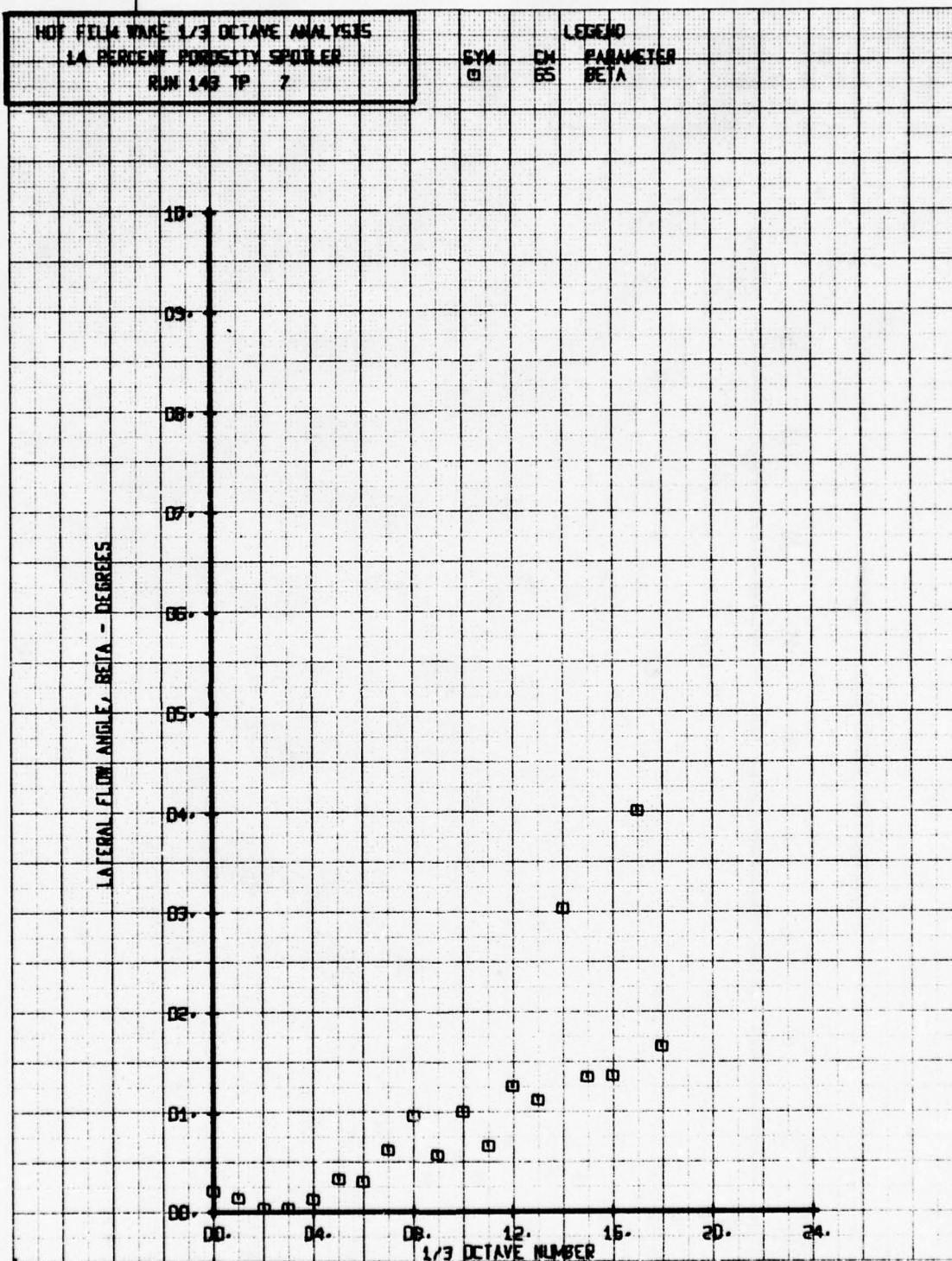
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 7

LEGEND
 SYM CH PARAMETER
 □ BS BETA

LATERAL FLOW ANGLE, BETA - DEGREES



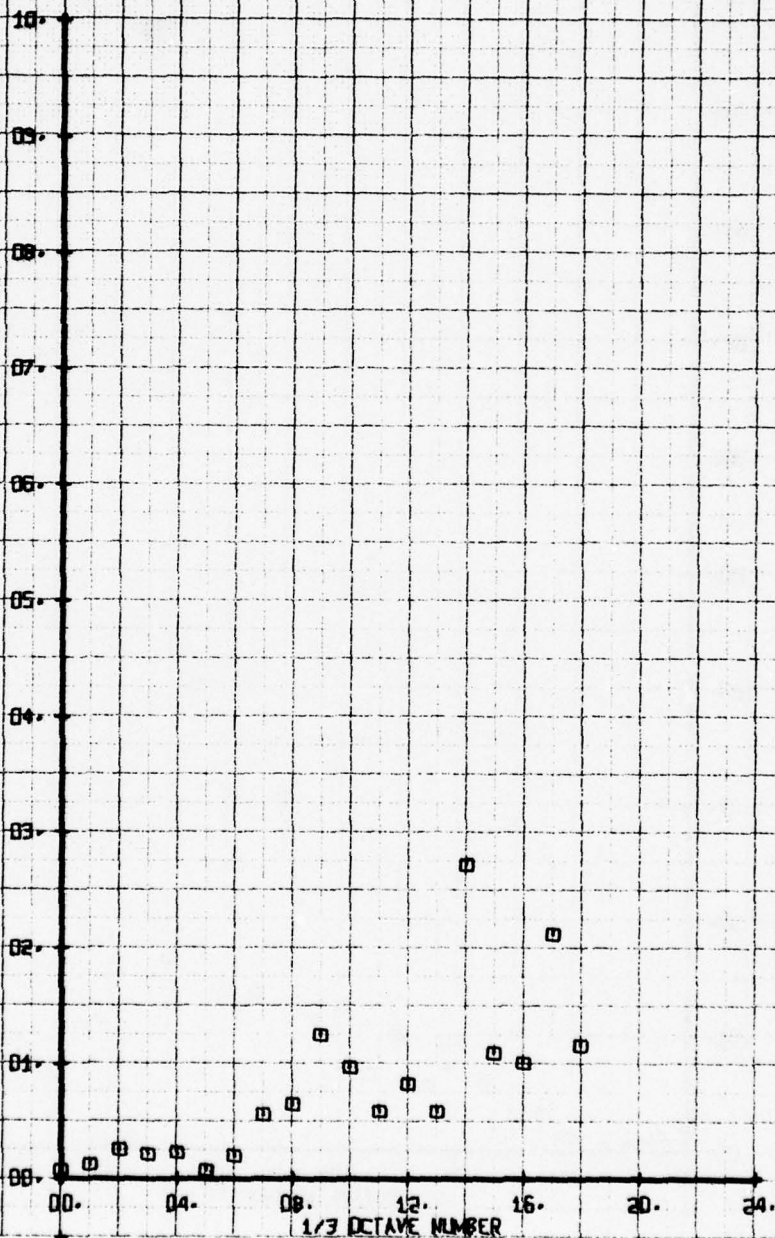
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 8

SYM
 □

Q1
 □

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

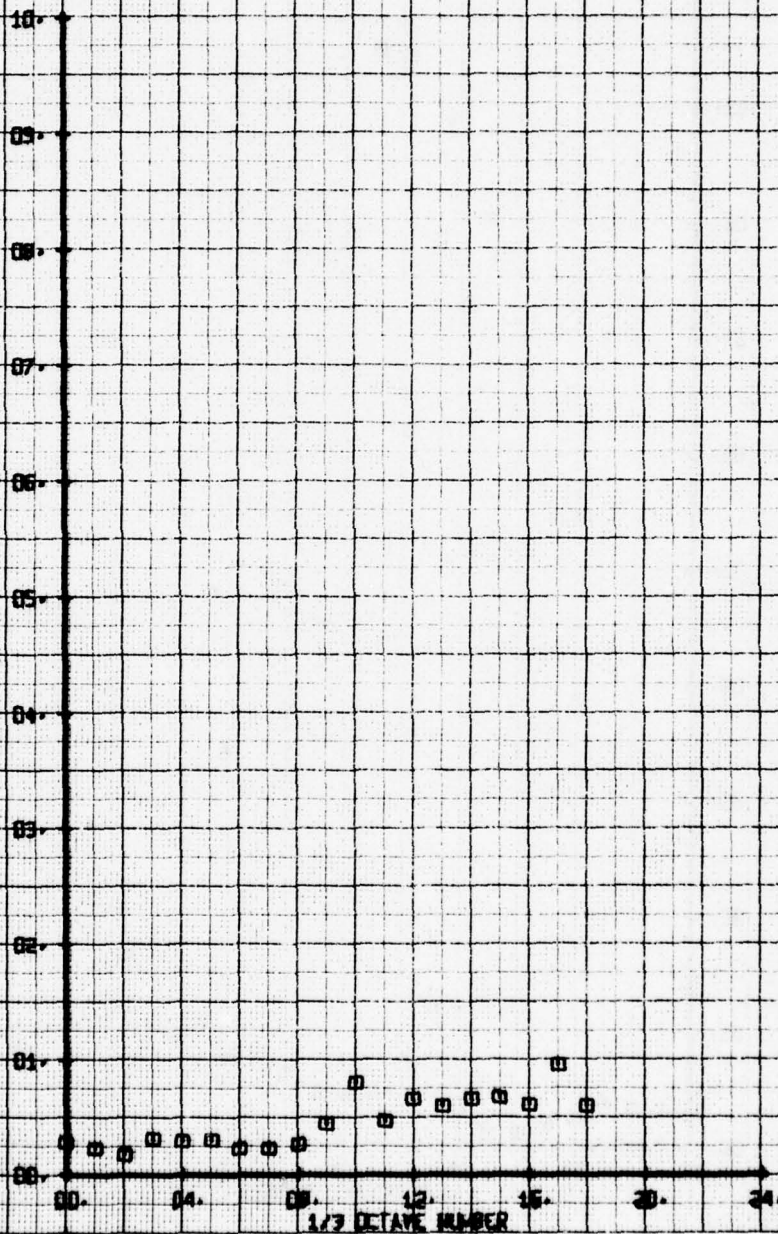


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 9

SYM
 □

LEGEND
 CN 65
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



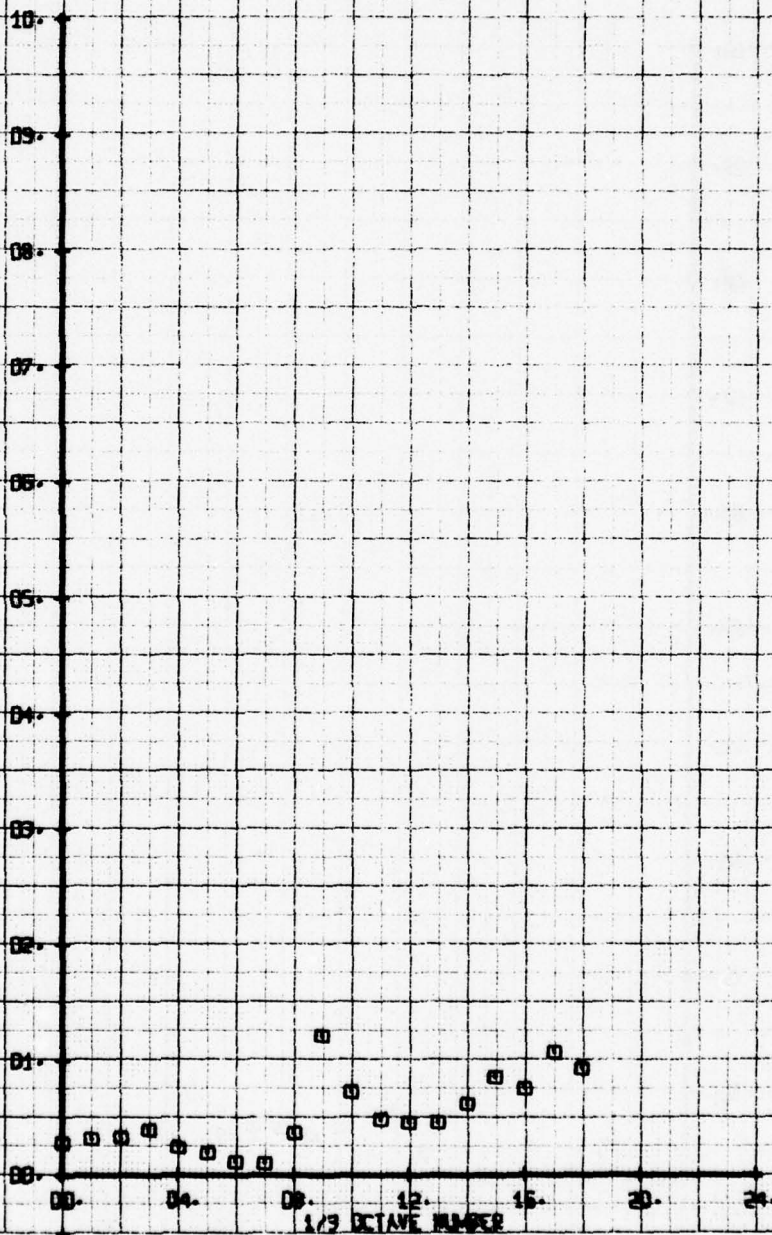
NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOTLER
 RUN 143 TP 10

SYM
 □

CH
 BS

LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOI FELIX WARE 1/3 OCTAVE ANALYSIS

14 PERCENT POROSITY SPOILER

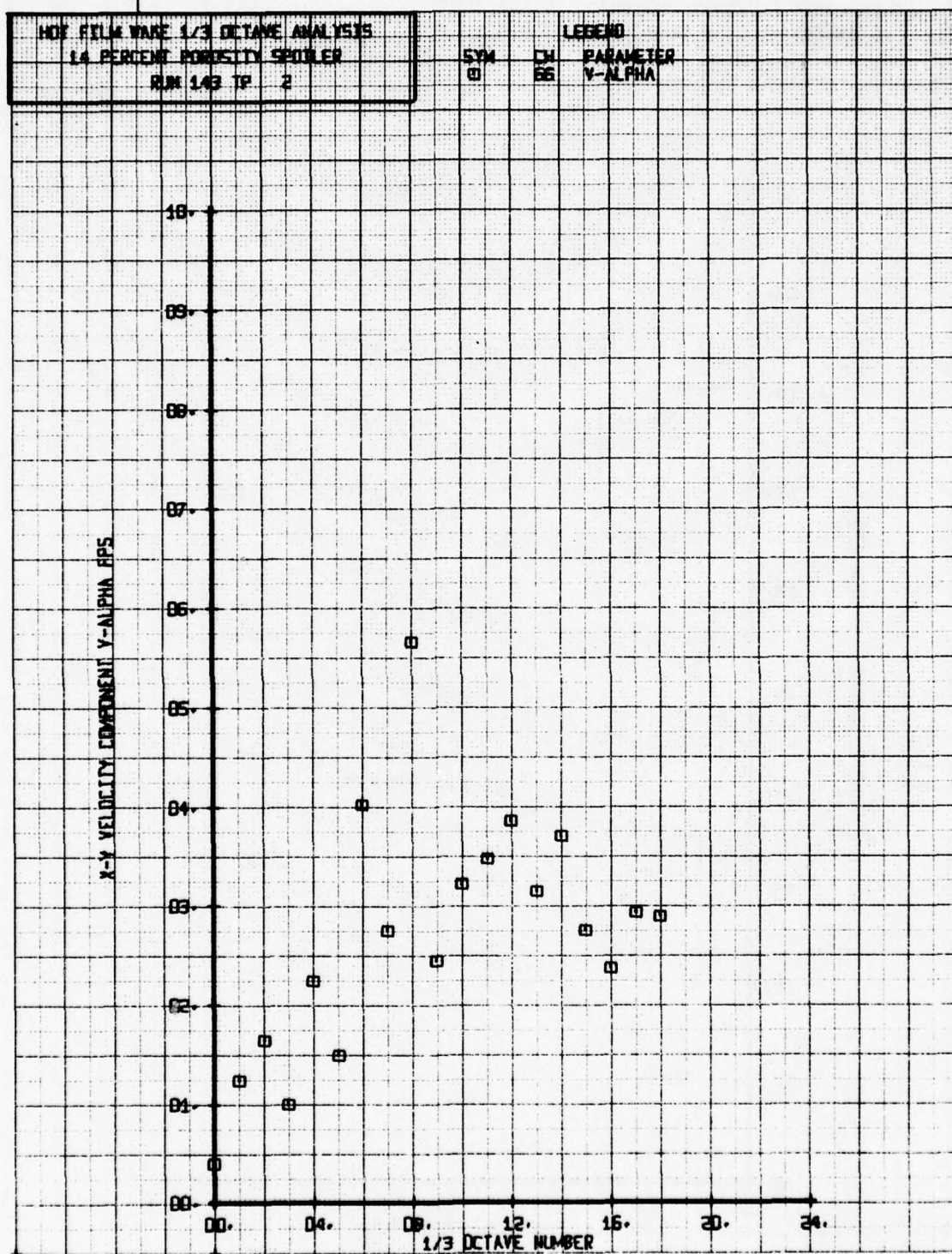
RUN 143 TP 2

SYM
0

CH
66

LEGEND
PARAMETER
Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA EPS



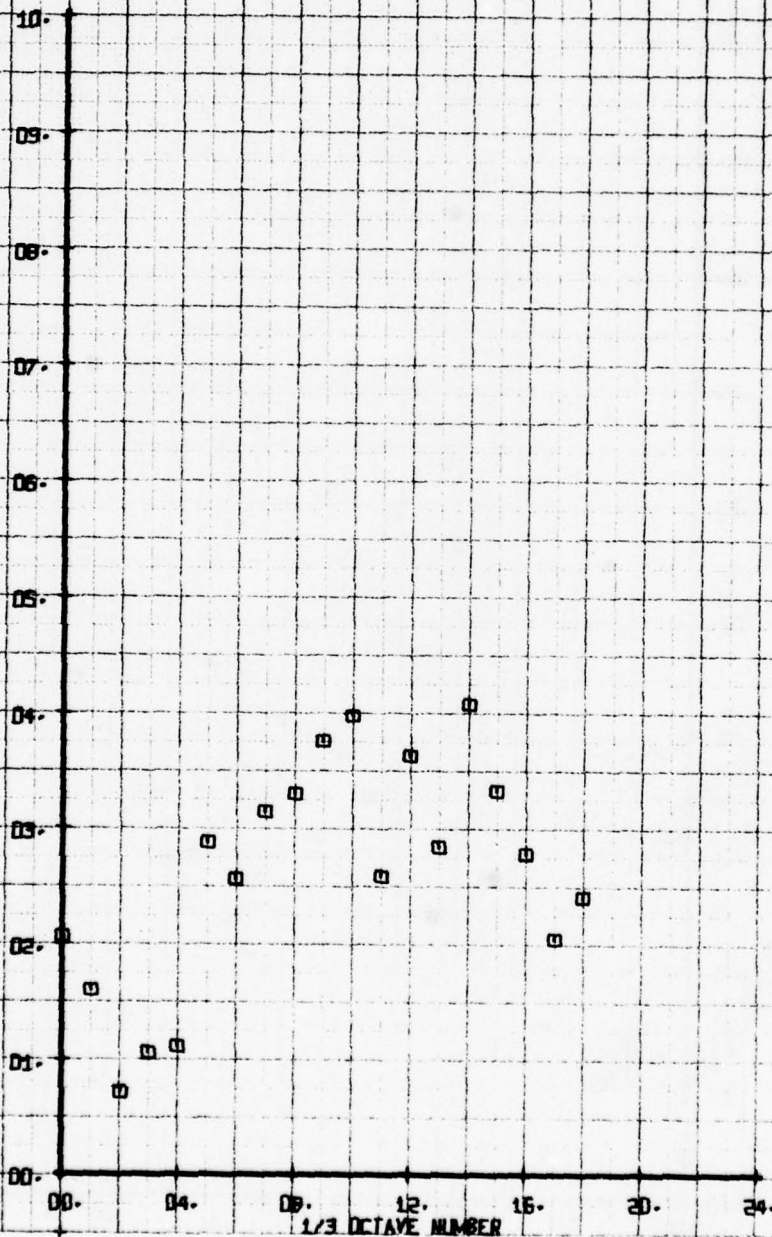
NOF FILM WAKE 1/3 OCTAVE ANALYSIS
14 PERCENT POROSITY SPOTLER

RUN 143 TP 3

SYM
0

LEGEND
EN
66
PARAMETER
Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA FPS



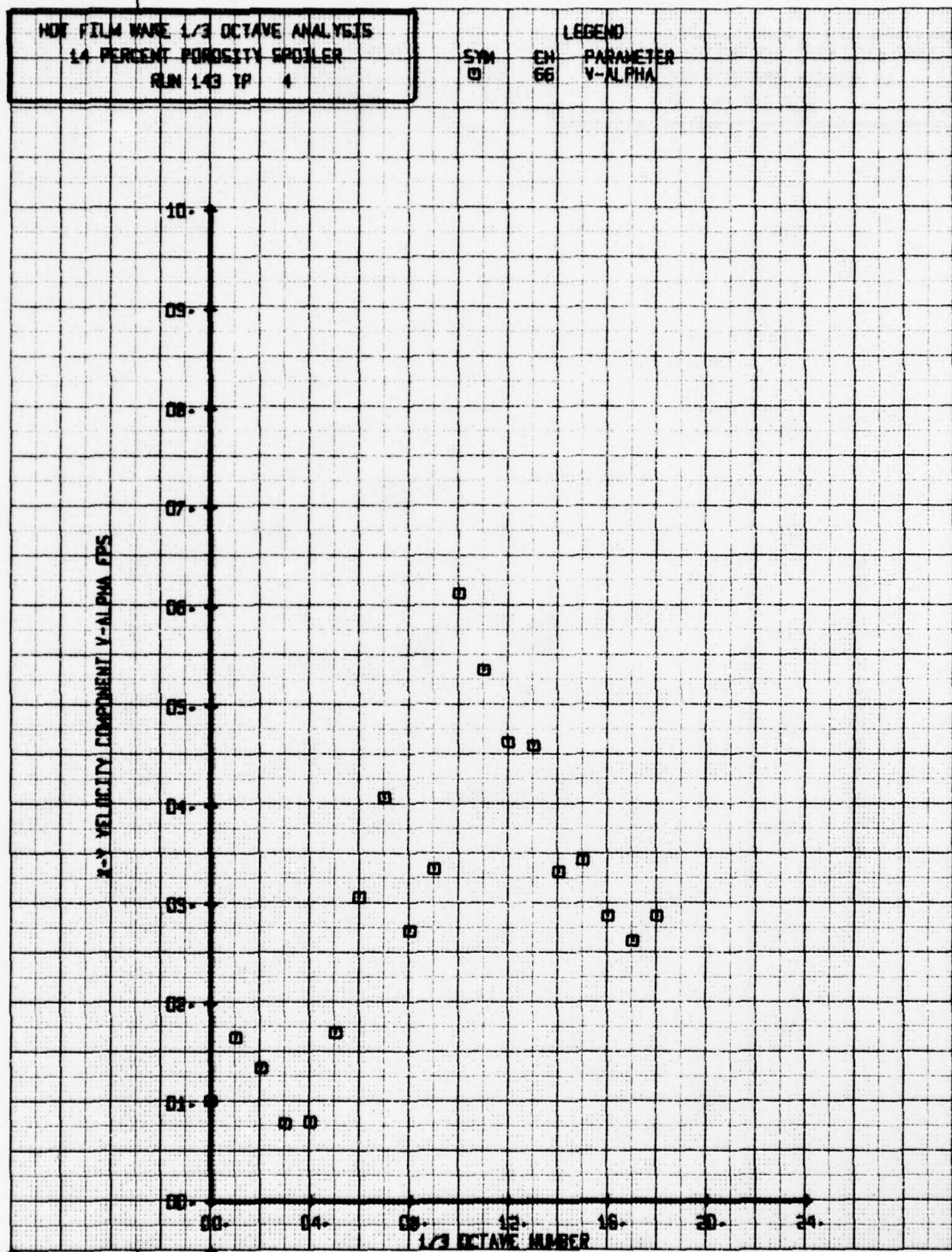
NOF FILM WAVE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 4

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS

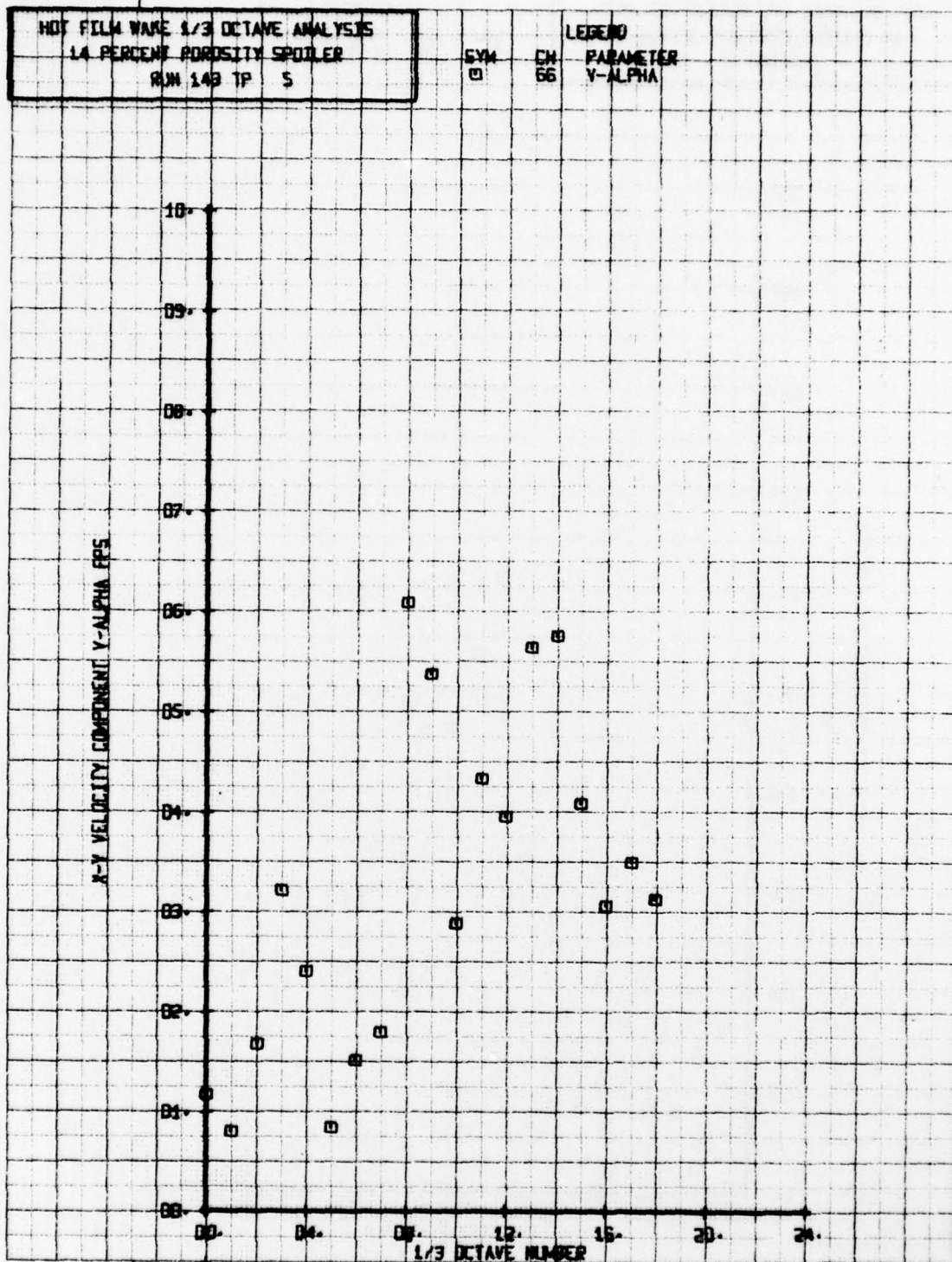


HOT FILM WARE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOTLER
 RUN 148 TP S

SYM
 □

LEGEND
 CH 66
 PARAMETER
 Y-ALPHA

X-Y VELOCITY COMPONENT Y-ALPHA FPS



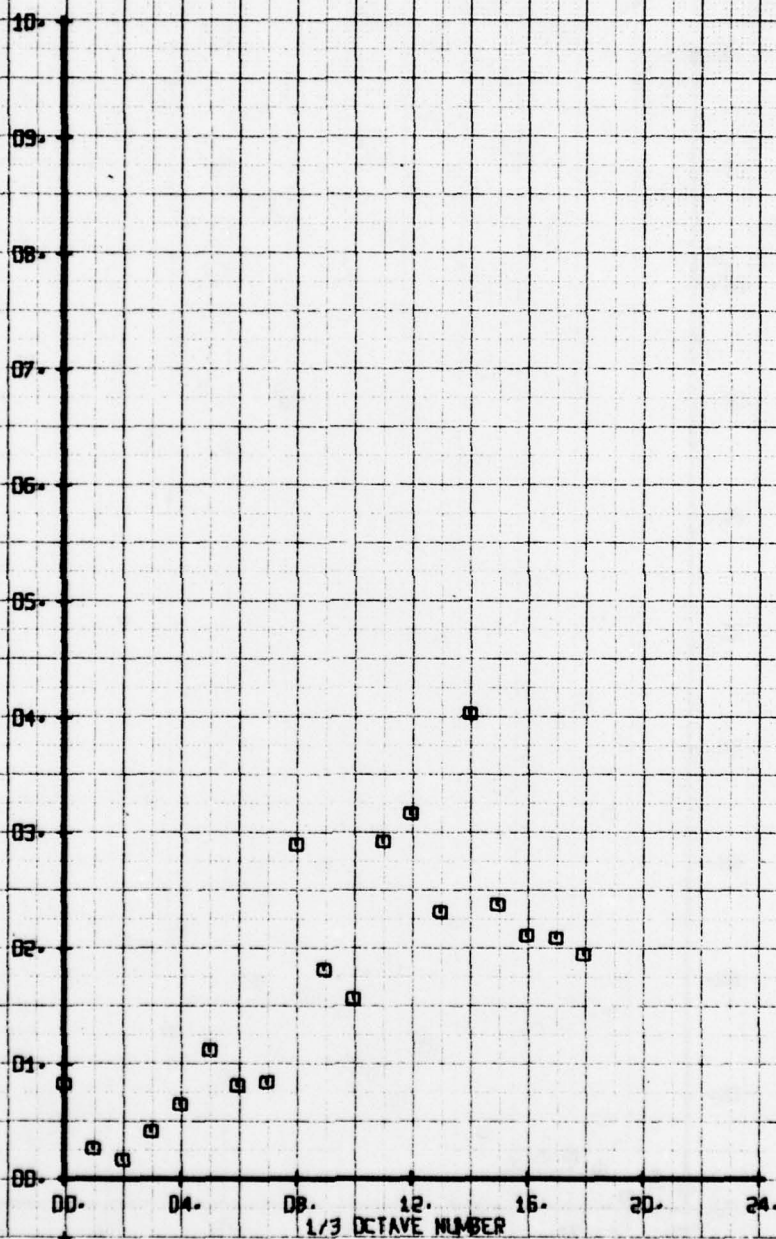
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 6

SYM
 @

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

K-Y VELOCITY COMPONENT V-ALPHA FPS



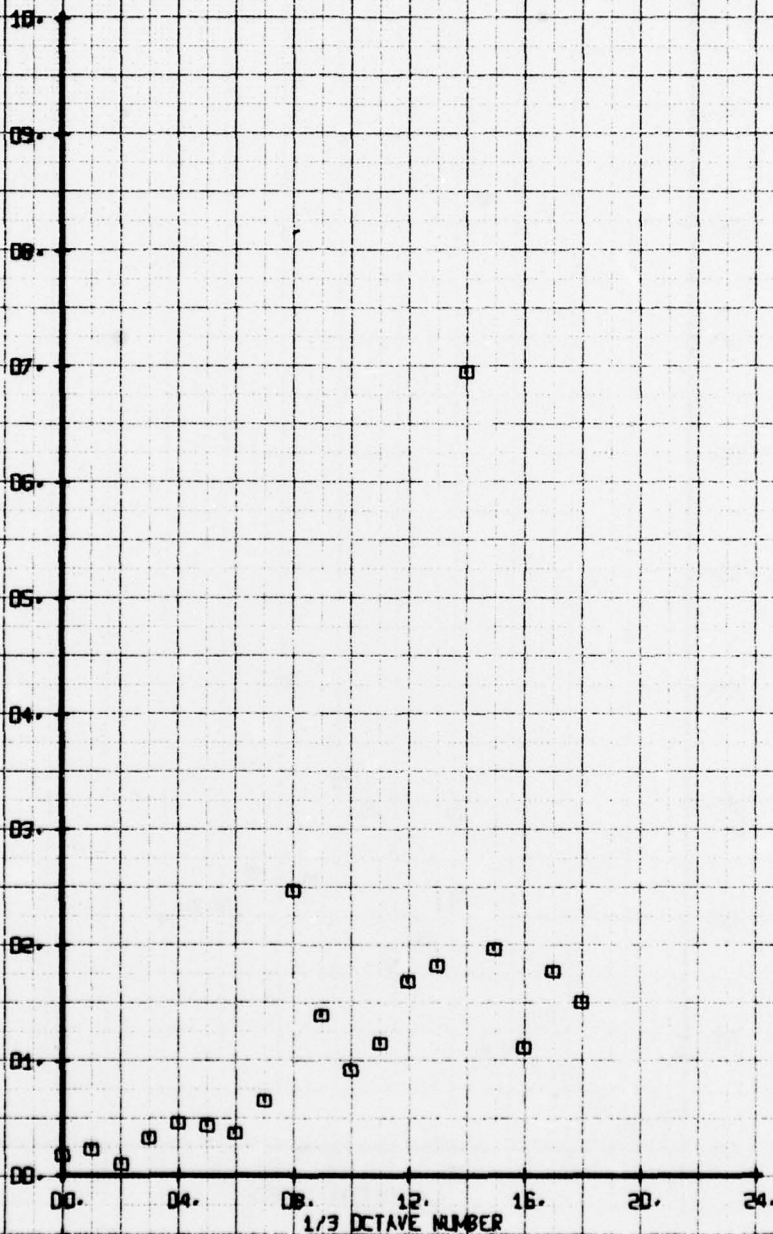
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
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 RUN 143 TP 7

SYM
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CH
 66

LEGEND
 PARAMETER
 V-ALPHA

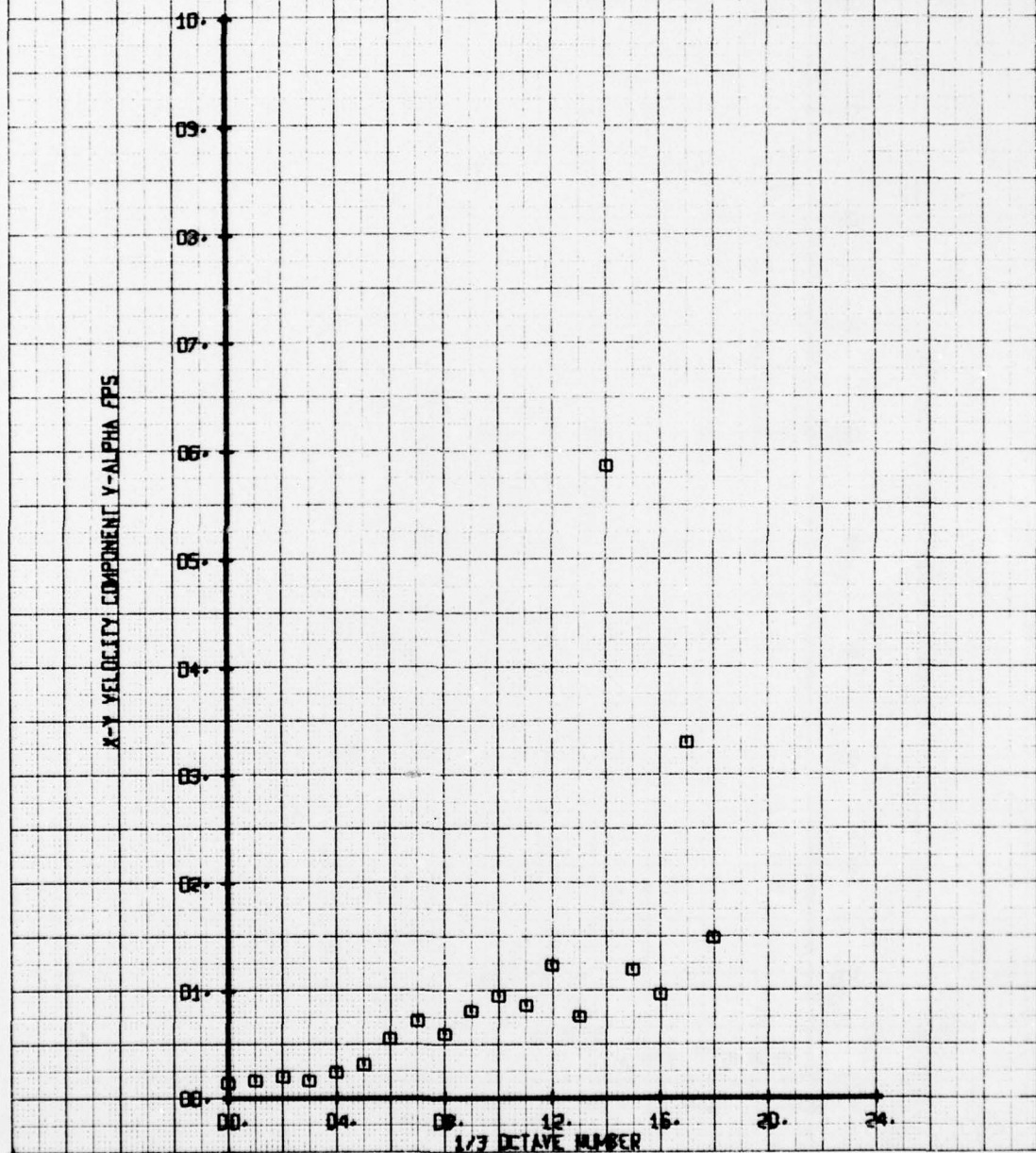
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
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SYN CH PARAMETER
 0 66 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS

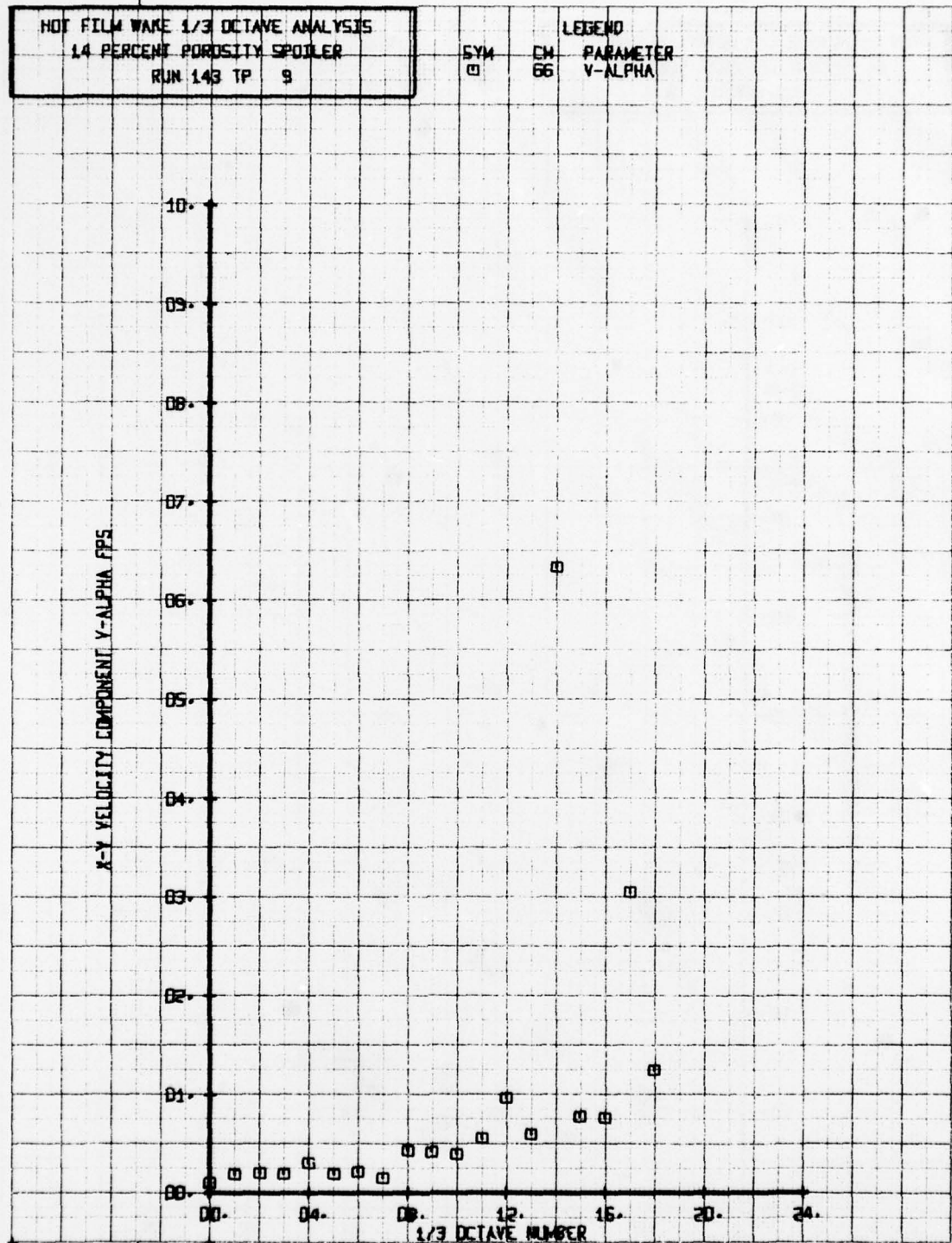


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
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SYM
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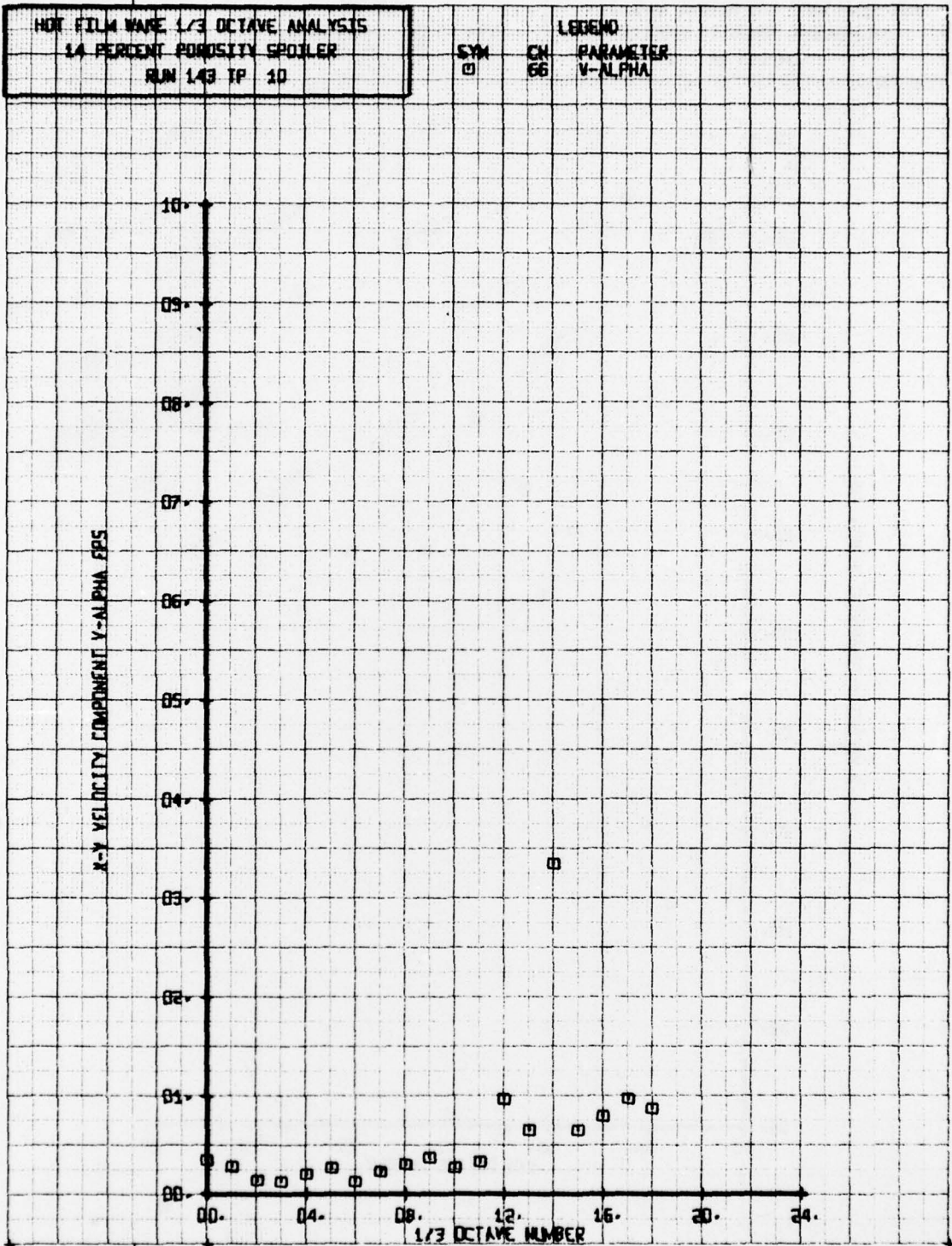
CH
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LEGEND
 PARAMETER
 V-ALPHA



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 10

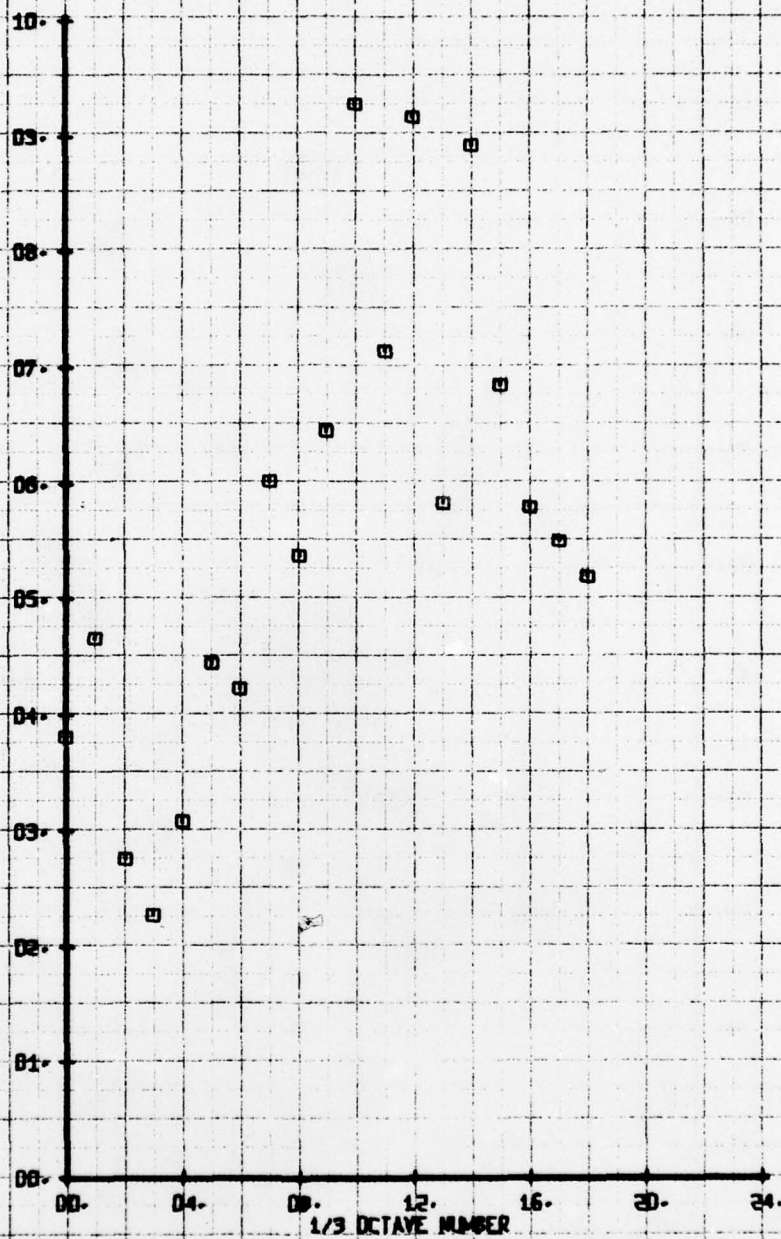
SYM	CH	LEGEND
□	66	PARAMETER V-ALPHA



NOF FILM WAVE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 3

SYM EN PARAMETER
 □ 65 V-BETA

X-1 VELOCITY COMPONENT V-BETA FPS



NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 4

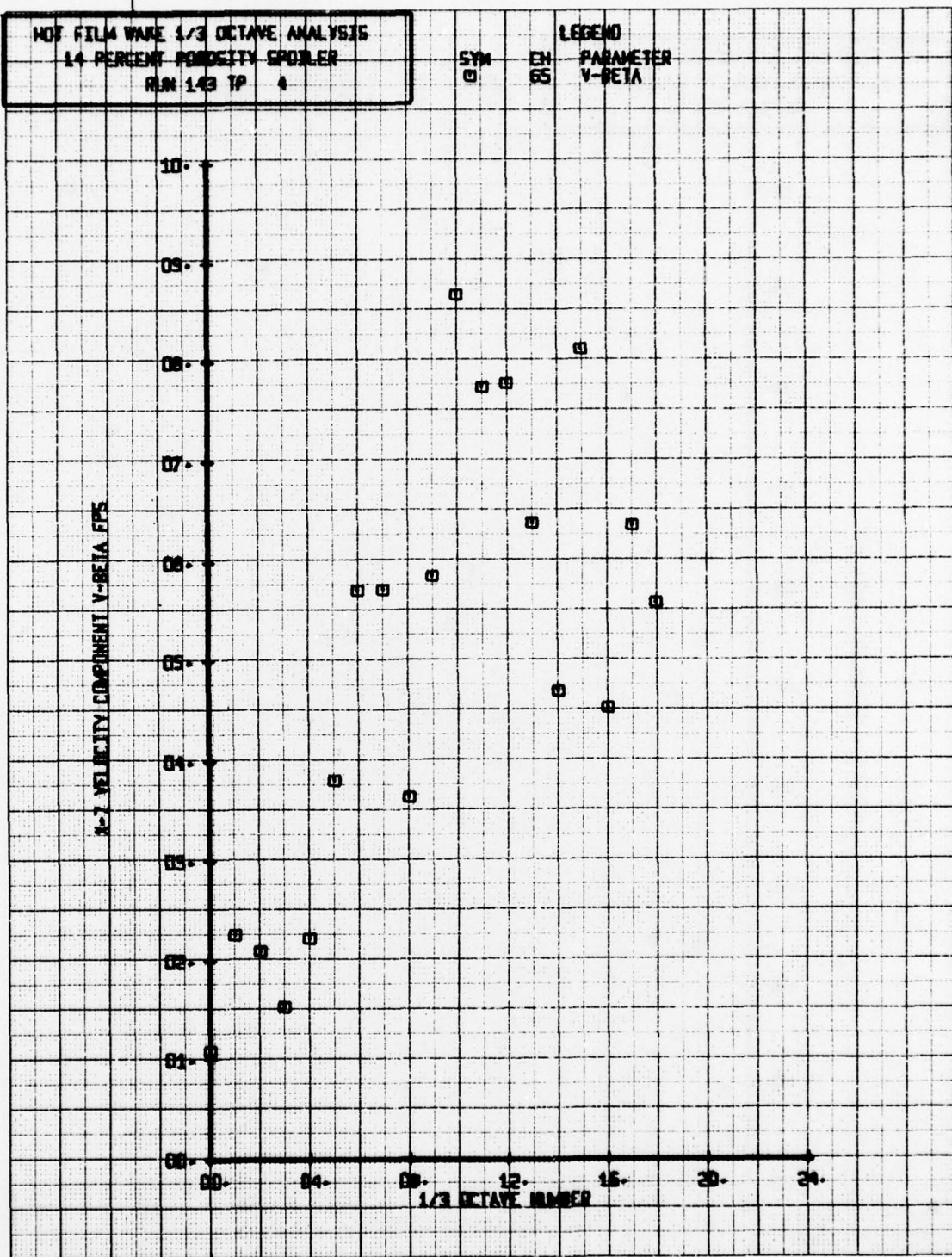
SYM
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EN
 SS

LEGEND
 PARAMETER
 V-BETA

1/2 VELOCITY COMPONENT V-BETA FPS

1/3 OCTAVE NUMBER



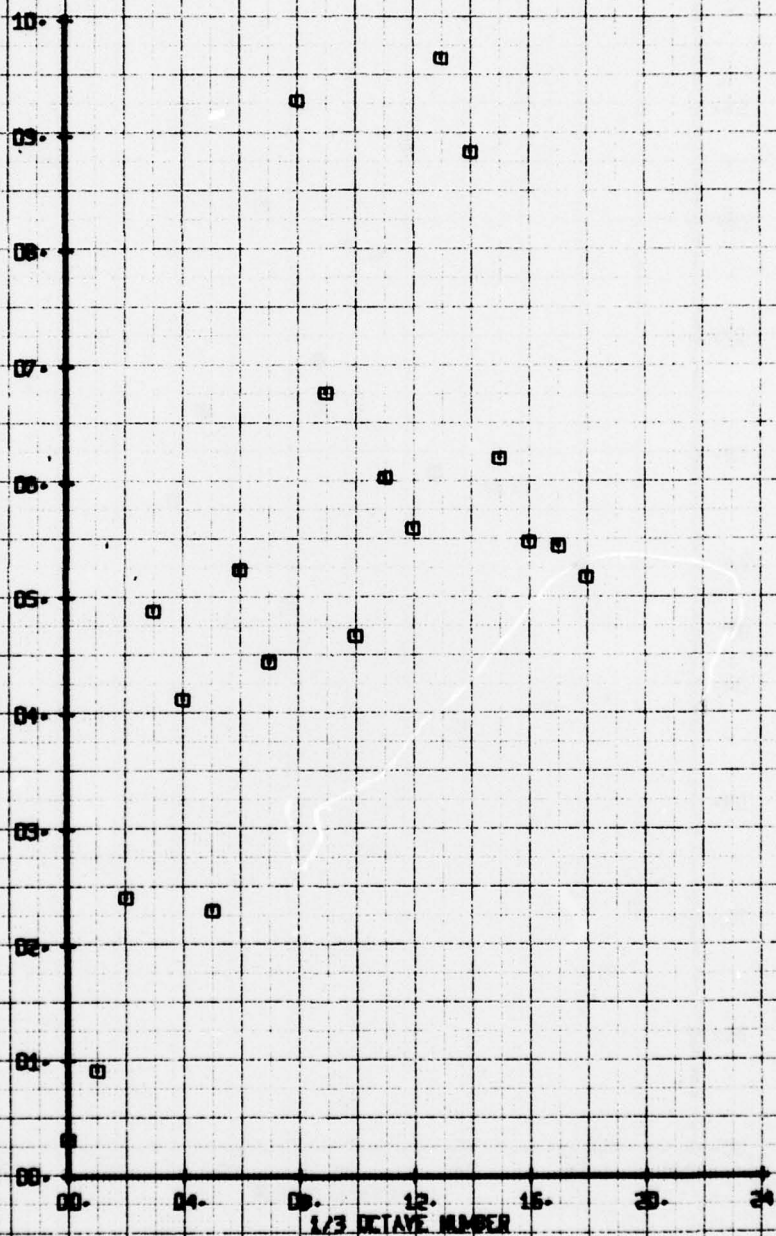
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 RUN 143 TP 5

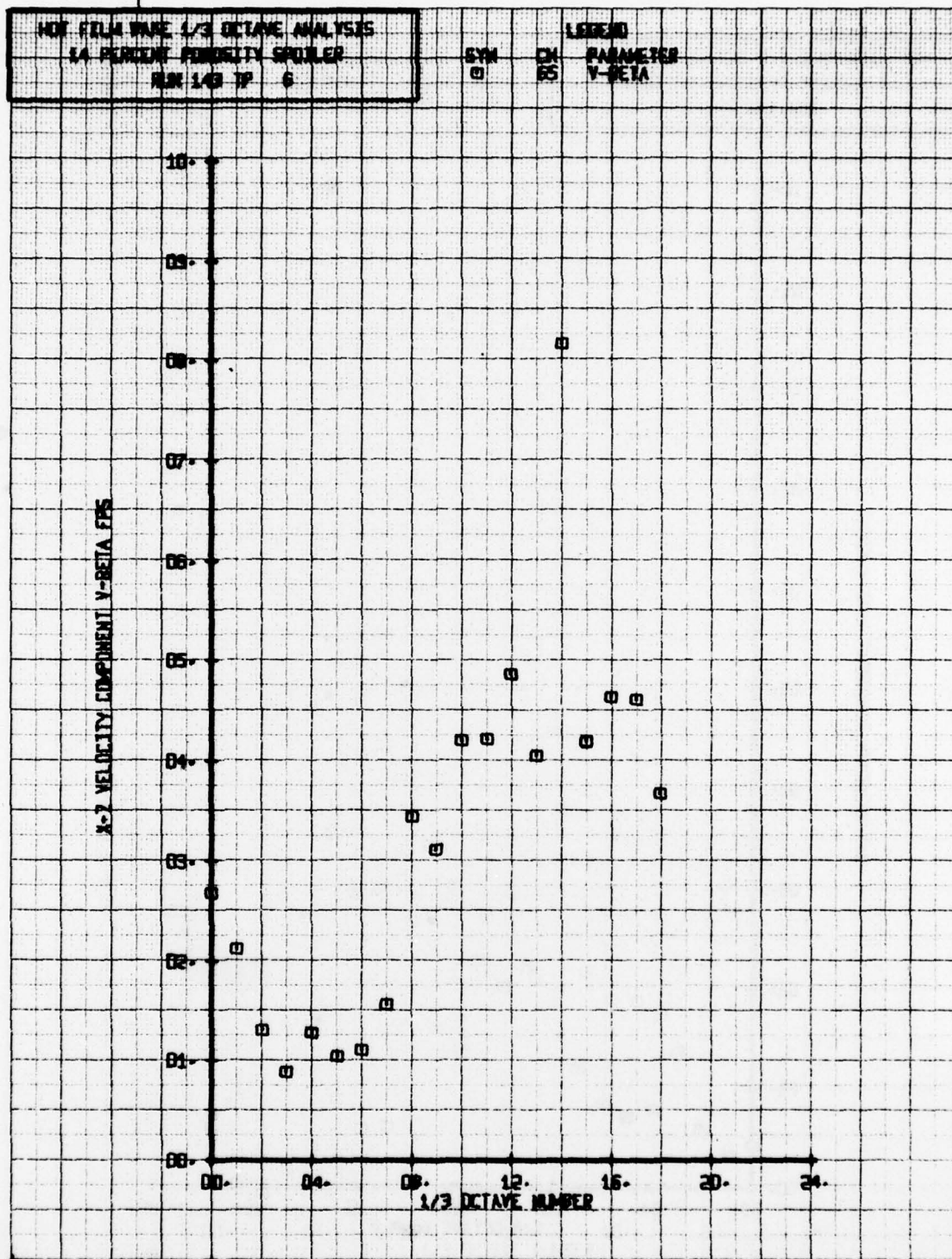
SYM
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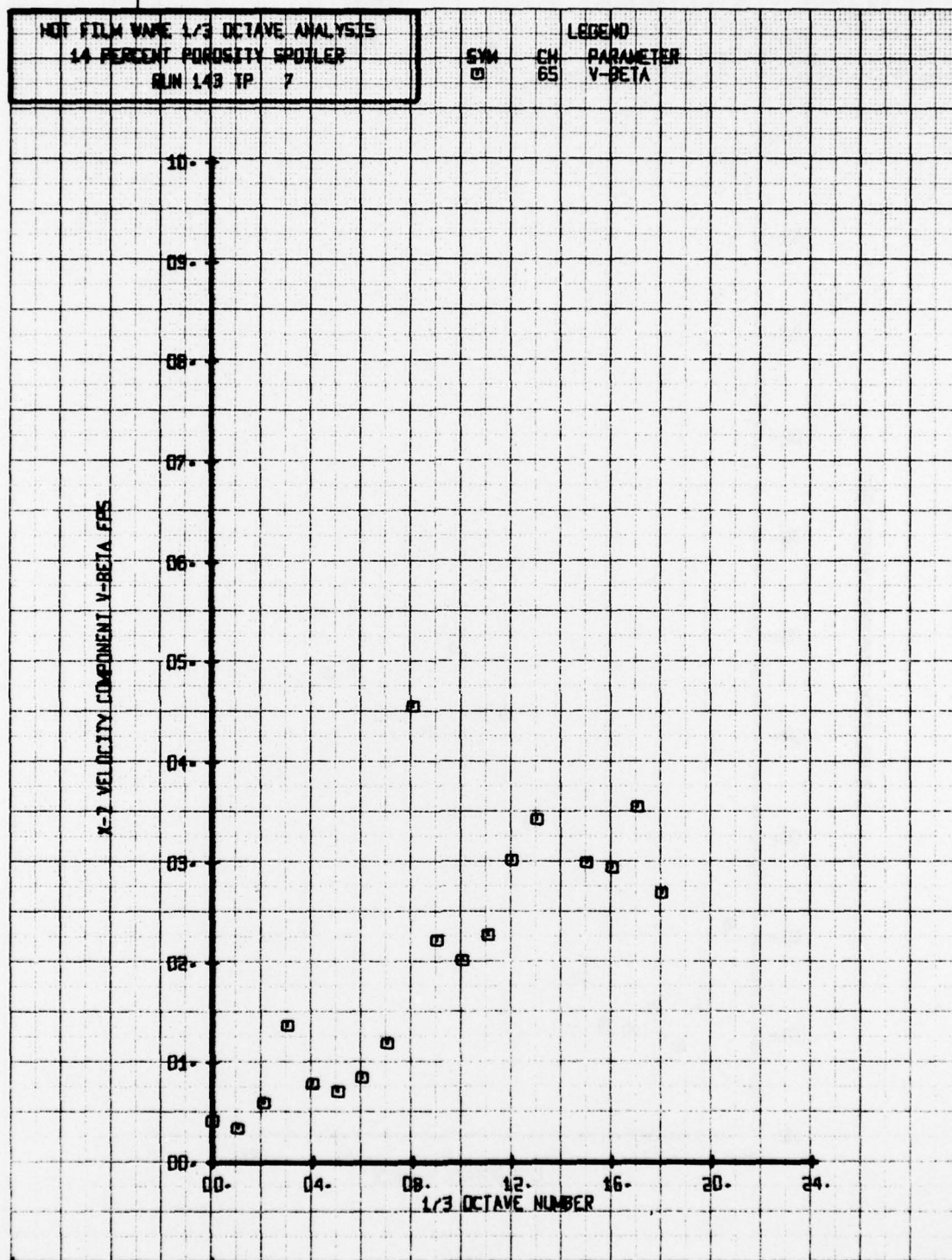
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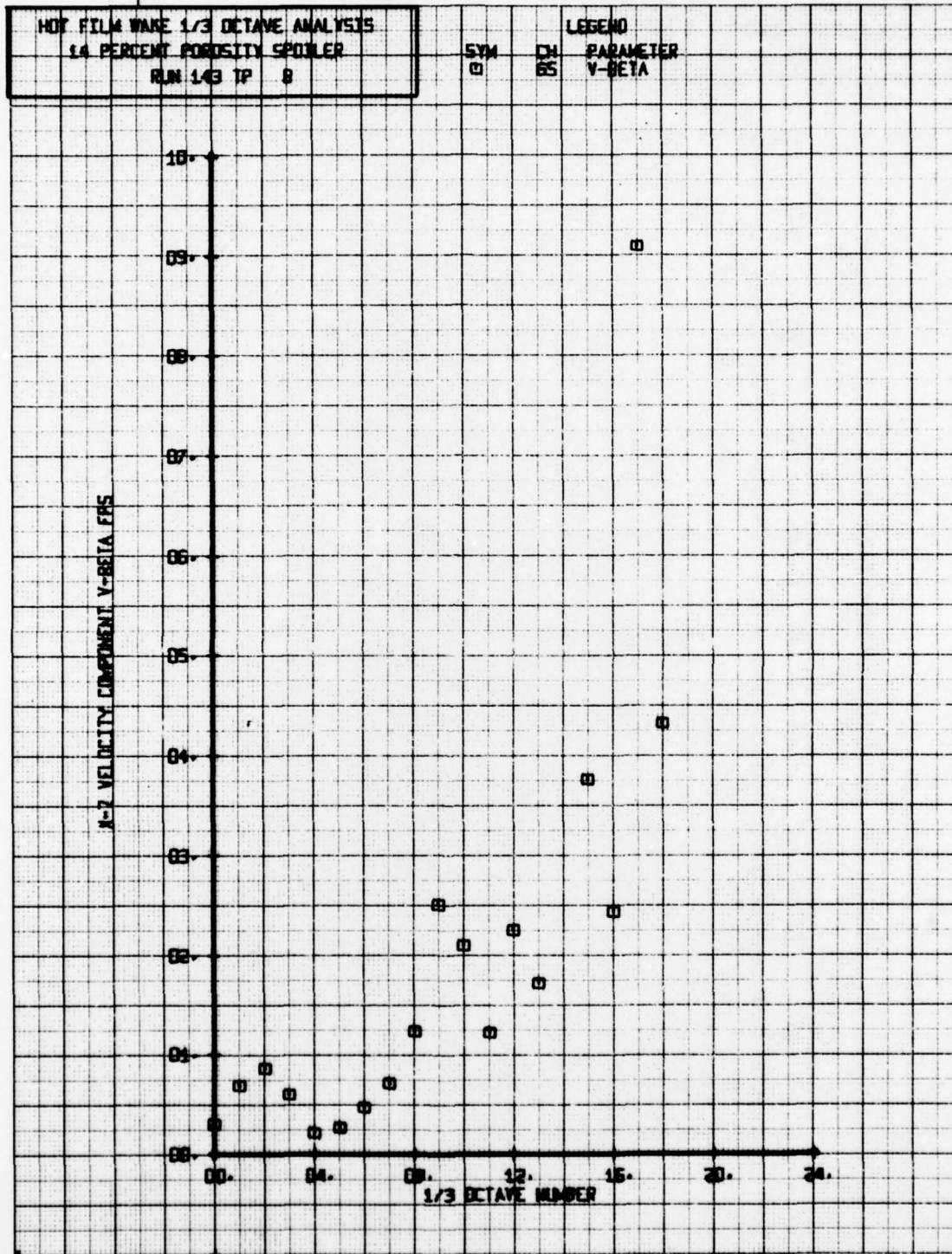
LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FFS









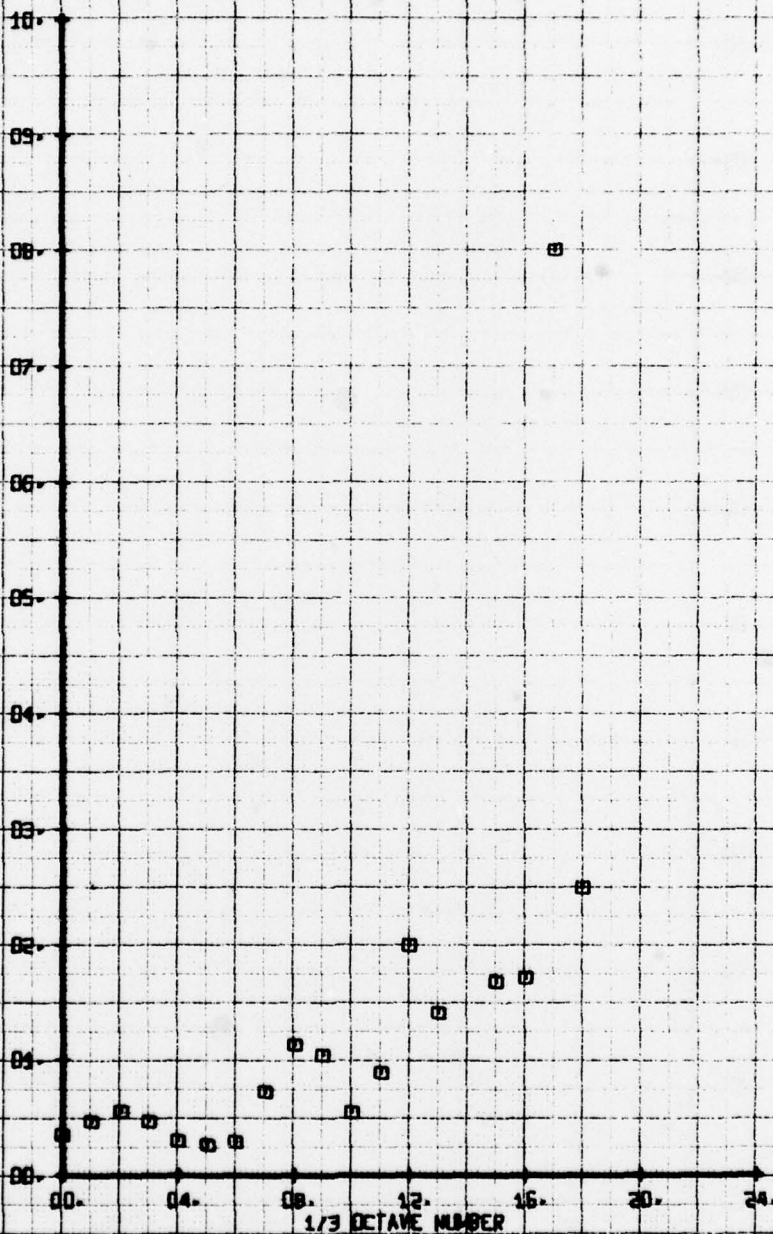
HOT FILM WARE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOTLER
 RUN 143 TP 9

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FRS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 14 PERCENT POROSITY SPOILER
 RUN 143 TP 10

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS

